Rocky Mountain ENVIRONMENTAL ASSOCIATES, INC.

HOW REVISIONS TO IDAHO'S WELL CONSTRUCTION STANDARD WILL PROTECT GROUNDWATER RESOURCES

PREPARED FOR AND SUBMITTED TO

Idaho Department of Water Resources
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EXECUTIVE SUMMARY

Idaho Department of Water Resources [IDWR] retained Rocky Mountain Environmental℠[1](RMEA) to consider possible revisions to clarify Idaho's Well Constructions Standards [IDAPA 37.03.09], to strengthen enforcement, and to protect Idaho's groundwater. Rocky Mountain Environmental℠ solicited recommendations to revise the standard from members of the Idaho legislature, Idaho Water Resources Board, Idaho's well drillers, Professional Geologists, Professional Engineers, and scientists employed by IDWR, Idaho Department of Environmental Quality (IDEQ), and District Health Departments and in private practice, Idaho Association of Cities, and Idaho Rural Water Users.

Based on research and discussions with these groups, Rocky Mountain Environmental℠ believes that the well construction standard can and should be revised. Specifically,

- *Well Seals.* The seal around the outside of the well casing prevents both downward flow of surface water and flow up and down the outside of the casing between aquifers. Any revision to the standard for well seals will be challenging, because seals are expensive to install. Some stakeholders are adamant that thicker and deeper seals are necessary to protect groundwater. On the other hand, many drillers believe the current standard and the methods to seal wells are adequate to protect groundwater. Regardless, any revisions to the standard should allow drillers to apply their professional judgement during well installation.

- *Well Plugging.* Across Idaho, there are innumerable wells that are unused and in disrepair. These orphan wells are conduits for contamination that threatens Idaho's groundwater. Almost all stakeholders agree a solution is needed and that Idaho's drillers have an critical role in identifying and plugging orphan wells. Everyone, however, recognizes that finding the funding to pay for properly plugging unused or damaged wells will be the challenge.

- *Well Disinfection.* An increasing number of wells in Idaho contain bacteria, and a majority of stakeholders believed that disinfection should be required at the completion of well drilling and whenever pumps are installed or replaced. Because disinfection is clearly beneficial, inexpensive, and easily accomplished, the revised standard should require disinfection.

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[1] *Rocky Mountain Environmental* is a registered service mark of Rocky Mountain Environmental Associates, Inc.

- *Clarity and Enforceability.* As IDAPA 37.03.09 is revised, particular care should be taken to clearly outline the roles and responsibilities of well drillers [and well designers when different], well owners, and other individuals, such as pump installers. Clearly outlining the responsibility of each will make enforcement easier. Several areas were identified as causing confusion, such as inclusion by reference to District Health Department or IDEQ rules. A revision should define the different types of wells, such as domestic, monitor, irrigation, or public water system wells, and the requirements that should apply to each type.

We also identified *well siting* as a critical issue, but it may be resolved without revising IDAPA 37.03.09. Currently, conflicts arise when well drillers and septic installers try to fit both wells and septic systems on small lots, lots with limited soil cover, or too close to property boundaries or rights-of-way. Now, the standard only refers to set-back requirement in other rules, but provides no mechanism to resolve siting conflicts or to assign responsibility for resolution. However, stakeholders are committed to develop working solutions. We believe that the Department should implement a pilot program to develop cooperative management strategies to site wells and septic tanks. Working together, Idaho's well drillers and the professionals employed at IDWR, Idaho Department of Environmental Quality [IDEQ], and District Health Departments can successfully resolve this issue.

As Rocky Mountain Environmental℠ traveled across Idaho, we realized that stakeholders are committed to improving the well construction standards. However, the stakeholder meetings described herein were held in separate forums where stakeholders have largely heard input from people who share the same or similar perspectives. Even in these forums, stakeholders are not unanimous, and no agreement was reached on specific revisions to IDAPA 37.03.09.

In the next step, stakeholders with different perspectives must come together to develop specific language to revise IDAPA 37.03.09. A list of volunteers from a variety of stakeholders willing to participate in negotiated rule-making was assembled. We firmly believe that, through negotiated rule-making, Idaho Department of Water Resources [IDWR] can successfully revise IDAPA 37.03.09 to ensure safe, reliable groundwater.

How is this report organized?

1. *Introduction and background*. This section outlines the goals and objectives of the report and why well construction standards are important to Idaho.
2. *Stakeholder Issues and Concerns*. In assembling stakeholder concerns, Rocky Mountain Environmental℠ solicited information and ideas about possible revisions to IDAPA 37.03.09.
3. *Recommendations to the Director, IDWR.* This section of the report identifies areas of IDAPA 37.03.09 that might be revised to enhance clarity and understanding of the rules, ensure adequate protection of ground water resources, or improve enforcement of the rules.

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INTRODUCTION

Why was this report prepared?

Idaho Department of Water Resources [IDWR] retained Rocky Mountain Environmental℠[2](RMEA) to examine Idaho's Well Construction Standards (IDAPA 37.03.09), to seek stakeholder input, to review well construction standards in neighboring states, and to recommend possible revisions to the rules. If the rules were clarified and enforcement strengthened, the revisions would improve protection of Idaho's groundwater resources.

What does the Well Construction Standard cover?

The Standards address several topics:

a. Cold Water Wells. Rule 25 establishes standards for cold water wells, such as wells for single-family homes, irrigation wells, and monitor wells.
b. Low Temperature Geothermal Wells. Rule 30 establishes construction standards for wells that produce water between 85° F and 212° F.
c. Health Standards. Rule 35 outlines standards for public supply wells [3], identifies the steps to take when mineralized or contaminated water is encountered, references the well siting rules of other agencies, and requires the owner to maintain his well.
d. Areas of Drilling Concern. Rule 40 allows the Director to designate areas of drilling concern to protect public health or to prevent waste and contamination due to aquifer pressure, vertical depth to aquifer, and warm, hot, or contaminated groundwater.
e. Drilling Permit Requirements. Rule 45 established procedures to issue drilling permits.

Why are well construction standards important to Idaho?

Idahoans rely upon groundwater to provide drinking water and the life-blood of agriculture. Idaho depends upon safe, abundant groundwater.

a. There are about 2,080 public water systems [PWS] in Idaho that provide drinking water to Idahoans from groundwater. The PWS supply

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[2] *Rocky Mountain Environmental* is a registered service mark of Rocky Mountain Environmental Associates, Inc.

[3] Whereas IDAPA 30.03.09 applies to construction of all cold-water wells, the standards are supplemented by the Idaho Department of Environmental Quality [IDEQ] for public water supply wells at IDAPA 58.01.08 *et. seq*

groundwater to major cities and towns, such as Boise, Idaho Falls, Pocatello, Meridian, and Coeur d'Alene, to motels, campgrounds, and restaurants across rural Idaho.

b. About 5,000 wells are drilled each year in Idaho. This number includes wells at single-family residences, wells for PWS, irrigation wells, and monitor, injection, and geothermal wells.

Well construction standards are important to Idaho's supply of safe groundwater. Wells installed to inadequate or antiquated standards threaten Idaho in several ways:

a. Wells without adequate *surface seals* may be preferential pathways through which bacteria and chemical contaminants degrade Idaho's water quality. Case Study #1 is an example of groundwater contamination caused by an inadequate surface seal.

b. Wells that penetrate aquifers, but are not adequately sealed [*formation sealing*], allow loss of artesian pressure, permit movement of poor-quality groundwater into aquifers of high quality, and change of the temperature of groundwater, all of which reduce the beneficial use of Idaho's groundwater. Case Study #2 and #3 are examples of groundwater contamination caused by inadequate formation and surface seals.

c. Wells are not generally the source of bacterial contamination. But, new wells often test positive for bacteria, and well and pump disinfection can reduce bacteria in water systems. Case Study #3 demonstrates that disinfection and the installation of thick, deep seals will protect groundwater and public health.

d. Orphan, unused, or damaged wells are *conduits* for groundwater contamination and may be a safety hazard. Many are not properly plugged. Case Study #4 contains photographs of orphan wells.

e. Wells located too close to septic tanks may be conduits for groundwater contamination, and the expense of re-locating wells or septic tanks should be avoided, if possible.

f. Wells that produce excessive sand erode well heads and the producing aquifer itself and destroy both surface and formation seals. Excessive sand production will result in preferential pathways to degrade Idaho's water quality.

What stakeholders provided input and ideas to this report?

Stakeholders solicited include:

a. Members of Idaho's Senate and House of Representatives;
b. The Idaho Water Resources Board;
c. Staff from four offices of IDEQ;
d. Staff from four offices of IDWR;
e. Staff from four offices of the District Health Departments;
f. Professional Engineers and all Professional Geologists residing in Idaho. (Over 1,300 notices were mailed.)
g. Idaho Association of Cities;
h. Groundwater scientists at Idaho State University [ISU] and Idaho Water Resources Research Institute [IWRRI] at the University of Idaho [UI];
i. Idaho Rural Water Users;
j. Well drillers licensed by the State of Idaho. (154 announcements were mailed.)
k. Public stakeholder meetings to solicit ideas and suggestions were held in Coeur d'Alene on May 5, in Idaho Falls on May 7, and Boise on May 9, 2003. (Public announcements were submitted to media outlets across Idaho);
l. Idaho Ground Water Association [IGWA]. Specifically,
    - The Driller's Advisory Committee, a group of 5 Well Drillers appointed by the Director IDWR, provided input on May 2, 2003.
    - The Board of Directors, IGWA, provided input, ideas, and suggestions at its meeting on May 10, 2003.
m. Officials responsible for well standards and enforcement in MT, WY, and WA. Plus, well standards adopted in MT, WY, WA, CO, OR, OH, and UT were assembled and examined.

WHAT PARTS OF THE WELL STANDARDS DO STAKEHOLDERS BELIEVE SHOULD BE REVISED?

Across Idaho, stakeholders repeatedly identified similar issues and topics where IDAPA 37.03.09 should be clarified or revised to protect groundwater resources. These themes are the basis for this report.

1. Well Seals

The seals in a water well serve several purposes. First, a *surface* seal prevents the flow of contaminated surface water [from snowmelt, runoff, or irrigation] down the outside of the well casing and into the aquifer. Second, *formation* seals prevent the movement of groundwater between aquifers, loss of water to thief zones, and the loss of artesian pressure.

> The thickness, length, and installation method for well seals is the most contentious issue raised during the evaluation of IDAPA 37.03.09. Stakeholders across Idaho hold conflicting viewpoints about surface and formation seals.

Many Professional Geologists, Professional Engineers, and scientists employed as private consultants, at universities, and in the District Health Departments, IDEQ, and IDWR believe that current methods to seal wells are inadequate. Generally, they believe that there is scientific evidence to demonstrate that:

1. Seals should be thicker [at least 2 in. around the outside of the casing], and the annulus filled with bentonite;

2. *Surface seals* should be set deeper than 18 ft;

3. The *formation seal* may extend upward to the point that it becomes continuous with and indistinguishable from the surface seal.
    a. In fact, two stakeholders recommended that all well seals extend from the producing zone up to the surface.
    b. In many cases, the formation seals should be installed to prevent cross-contamination of aquifers.

However, Idaho's professional well drillers have different viewpoints. Generally, Idaho's professional drillers believe that

1. Idaho's geology is so variable that each driller should be allowed to use their professional judgement on the depth to which seals should be installed.
    a. Some drillers pointed out that some geologic settings make surface seal of any kind meaningless, such as Eastern Idaho [where

contaminants might flow through nearby fractures in basalt] or the Prairie-Rathdum aquifer [where there are few barriers to vertical flow].

b. Many drillers stated that there is no scientific justification for increasing the length or thickness of seals. They stated that groundwater movement between aquifers is not possible, because the clay layers between aquifers squeeze closed against the casing and prevent flow between aquifers.

2. Idaho's well drillers have different attitudes toward the thickness of the seal.
   a. Drillers with experience in OR, WA, and MT are more accustomed to installing 2 in. thick seals and are generally supportive of requirements for thicker seals.
   b. Drillers in Eastern Idaho believe that a 1 in. seal, installed by pouring bentonite down the outside of the casing into the gap created by the drive shoe, is sufficient, if properly done.

3. In written comments, a stakeholder stated that Idaho should consider a "blanket" waiver of surface seal rules and rules concerning the maximum percentage of well depth which may be screened. Rather, the rules should instead concentrate on making both drillers and consultants responsible for the consequences of constructing any well which allows contaminants to move through confining layers.

2. Responsibility for Well Maintenance and Repair

Idaho's well drillers felt that they are unfairly blamed for contamination. Well drillers believe that wells built to current standards produce safe, reliable water. However, well owners may damage well casings, move sources of contaminants too close to well heads, and fail to maintain the integrity of the well. Additionally, well drillers believe they are blamed when the pump installer infects an otherwise clean well or when an installer of the pitless adapter destroys the integrity of the casing and seal. Drillers also identified other practices, such as geo-loop wells, lack of backflow preventers, and compromised wellheads, all of which are beyond their control and pose a greater threat to groundwater resources.

CASE STUDY #1: SURFACE SEALS

The current standard for surface seals only require a 1 in. gap around the outside of the surface casing. Many drillers pour dry bentonite around the gap caused the casing shoe, as the casing is driven into the ground.

In this example, a driller in Eastern Idaho poured dry bentonite down the gap around the outside of the casing. Unfortunately, because the casing was not centered as bentonite was added, there was a seal on only one side of the casing. Contaminated water flowed 180 ft down the casing and polluted groundwater.

No enforcement action was taken, and enforcement may not be possible, as the IDAPA 37.03.09 currently authorizes this practice and permits a 1 in. annular space.

Neighboring states [OR, MT, WA] require a 2 in. annular space on all sides of the surface casing . Specifically, a 6 in. casing is placed in a 10 in. hole, and the annular space is filled with bentonite.

Well drillers and other stakeholders identified well owner responsibility as part of IDAPA 37.03.09 that should be clarified and strengthened. Specifically, any revisions should require well owners to:

4. Protect the well from sources of contamination;
5. Repair the well immediately upon damage;
6. Plug orphan or unused wells or wells that are a threat to groundwater quality or public safety.

3. Well Siting

Many stakeholders identified well siting of domestic wells as an important issue that must be resolved. IDAPA 37.03.09 does not list the distances that a well must be separated from sources of contamination. Rather, IDAPA 37.03.09 refers the driller to rules of IDEQ and District Health Departments, adding to confusion. The rules provide no mechanism to resolve separation conflicts and do not clearly identify responsibility for compliance with set-back distances. Professionals working in regional health districts described situations where installation of the well precluded installation of the septic system, and vice versa, additional expenses for property owners caused by this lack of clarity.

Many managers of District Health Departments believe that responsibility for resolution of the siting conflict should reside in the District Health. As service providers, they supervise the installation of 7,000 septic systems and perform 2,000 to 4,000 mortgage surveys each year. Employees are assigned to every county and have first-hand knowledge of local conditions. District Health Departments approve the location of septic systems during approval of subdivision plats, and the districts believe that well sites [or exclusion zones] should be added to the approval process. In fact, the Panhandle Health District [PHD] offered to develop and implement a pilot program to coordinate well and septic tank siting.

Idaho's professional well drillers have differing and conflicting viewpoints.

1. Some drillers voiced the opinion that they should have no responsibility for well siting. They do not want to be delayed by siting issues when they are scheduling drilling. Other drillers concurred, saying they preferred to drill at a pre-determined location, where the homeowner [or someone else] had selected the location and had assumed the liability for adequate separation.

2. Many drillers stated that siting conflicts should be resolved during subdivision approval by planning and zoning.

3. There were two examples, one from northern Idaho and one in eastern Idaho, demonstrating that drillers could not rely upon the homeowner's compliance with setback requirements. Even though the homeowner assured him the setback was adequate, each driller had to pay to move a well installed too close to the septic tank.

4. Several drillers suggested that a 100-ft deep seal should fulfill the setback requirement. In fact, some Health Districts had used that explanation [a 100-ft deep seal was functionally equal to a 100-ft horizontal separation] to justify wells and septic tanks that were too close together.

While many specifics of well siting on small lots remains to be resolved, it was the general consensus that conflicts are largely an administrative or management problem. Idaho's citizens deserve a solution to this issue.

4. Well Plugging

Plugging of orphan, damaged, or unsafe wells was a topic raised by many Professional Geologists, Professional Engineers, and scientists. IDEQ believes that orphan wells are a significant, growing problem across Idaho. Many of Idaho's well drillers believe that increased emphasis on surface and formation sealing in new wells does not make sense, if old wells with inadequate or no seals leak contaminants to groundwater. No inventory of orphan, unused, or damaged wells (or wells abandoned in accordance with IDAPA 37.03.09) currently exists.

Most Idahoans would agree that orphan, damaged, or unsafe wells that contaminate groundwater should be plugged. However, stakeholders recognized that specific rules raise complicated issues. For example:

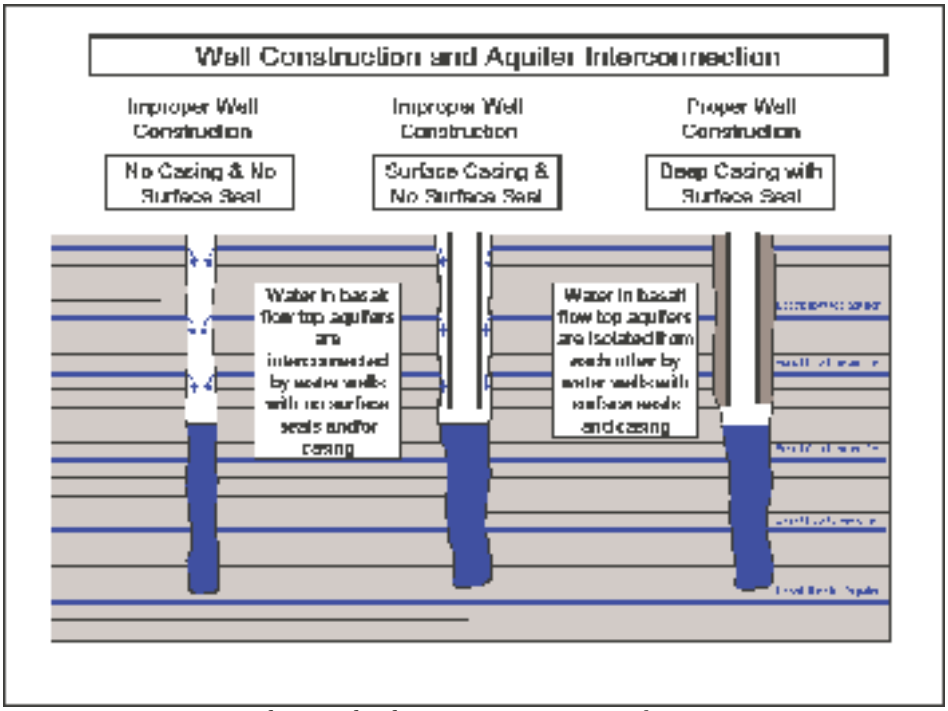
1. Idaho's well drillers believed that plugging should focus on older wells and that plugging of wells built to current standards should be a second priority.

2. Drillers pointed out that IDAPA 37.03.10 and Idaho statutes require that well abandonment be performed by a licensed well driller.

3. Some stakeholders believed that IDWR's approval to drill a replacement well should include a requirement to plug the old well. However, some drillers pointed out that sometimes the replacement well is really a second well. For example, in some geologic situations [low yield aquifers or aquifers with poor water quality], there may be good reasons to have more than one well.

4. Who has responsibility to determine if well(s) should be plugged? The well owner, IDWR, or state regulations?

CASE STUDY #2: SEALS MUST PREVENT CONTAMINATION BETWEEN AQUIFERS



From Stevens, G, Garwood, D. , and Ralston, D., 2003, Report of Geologic/hydrogeologic Services for City of Craigmont, Lewis County, Idaho: Completed by Idaho Water Resources Research Institute.

The current rules for sealing of casing require a minimum of 18 ft of casing and surface seal. Today in Idaho, the minimum has been the standard practice.

On the Clearwater Plateau, inadequately sealed wells have allowed nitrate-contaminated groundwater in the Wampum Basalt to flow down into the Grande Ronde Basalt, contaminating the aquifer providing water to the Cities of Craigmont, Nez Perce, and Ferdinand. The wells are not the *source* of contamination, but a *conduit* that threatens a resource vital to Idaho's future.

The wells are not the *source* of contamination, but improperly sealed wells can be a *conduit* that threatens Idaho's groundwater.

Many stakeholders believe that Idaho's well standards should clearly require both *surface* seals and *formation* seals, where needed, to prevent cross-contamination.

5. A stakeholder recommended allowing Professional Geologists [PG] or Professional Engineers [PE] to plug all types of orphan or damaged wells. He pointed out that IDWR recognizes that PGs or PEs can assume responsibility for protection of groundwater resources, i.e., they are permitted to sign the well completion schematics to drill monitoring wells. Thus, he believed that it would be protective of Idaho's groundwater to allow PGs and PEs to sign well plugging or abandonment forms. [NOTE: the statutory requirement that only licensed well drillers can plug (or abandon) wells may be waived by the Director, IDWR. The authority for PEs and PGs to abandon wells could be added by statute and by rule.]

6. Another driller thought that well owners could plug wells, provided they had received appropriate instruction and the plugging was inspected.

While all stakeholders are committed to plugging unsafe or damaged wells, stakeholders recognize that the biggest issue facing Idahoans is finding the money to pay for the plugging. Tax credits or low-interest loans were proposed. Many thought that the federal government should provide the funding.

5. Well Disinfection

Many Professional Geologists, Professional Engineers, and scientists [both employed as private sector and in the Health Departments, IDEQ, and IDWR] believe that bacterial infection of water wells is increasing across Idaho. IDAPA 37.03.09.025.19 only *recommends* disinfection, and these stakeholders believe that any revision to the standard should *require* disinfection.

Almost all well drillers agreed that disinfection was a sign of professionalism and should be required. However,

1. Drillers believed that disinfection needs to be reasonable and appropriate, not overkill. Steam cleaning would be too much.

2. Most stakeholders agreed that disinfection requirements should also apply to the pump installers, as they may infect the well after the driller has left the well site.

3. Stakeholders said that aquifer contamination from other sources is more of an issue than dirty wells. For this reasons, they suggested better bacterial testing and training, to ensure that infection is real, not a sampling error.

Stakeholders in Couer d'Alene and the Board of Directors, IGWA, generally agreed that they would support disinfection as a professional commitment. They did not believe that the cost of disinfection would be high or that it would be difficult. They believed that pump installers should also be required to disinfect after pump

repair or replacement. Drillers in Eastern Idaho were not unanimous, but generally supportive of disinfection.

6. Enforcement

Enforcement is an issue that stakeholders raised everywhere, but the perception of enforcement varied among stakeholders.

Idaho's well drillers routinely complained that IDWR is not performing sufficient inspections. Idaho's drillers do not want violations for paperwork mistakes, but believe that IDWR should focus on key steps, such as installing seals. Simple, "windshield" inspections of finished well heads was a waste of time. Drillers believed that enforcement must focus on the very small number of "bad" drillers, not the majority of Idaho's drillers who are doing a good job.

On the other hand, some IDWR employees did not believe that they received adequate support for enforcement. While some IDWR employees agreed the rules need clarification, all agreed there was little enforcement, largely due to what they perceive as political pressures applied by affected drillers.

Stakeholders also had several specific observations, many conflicting, about enforcement:

1. IDWR enforcement personnel need minimum training, and some suggested that inspectors should be journeymen well drillers.

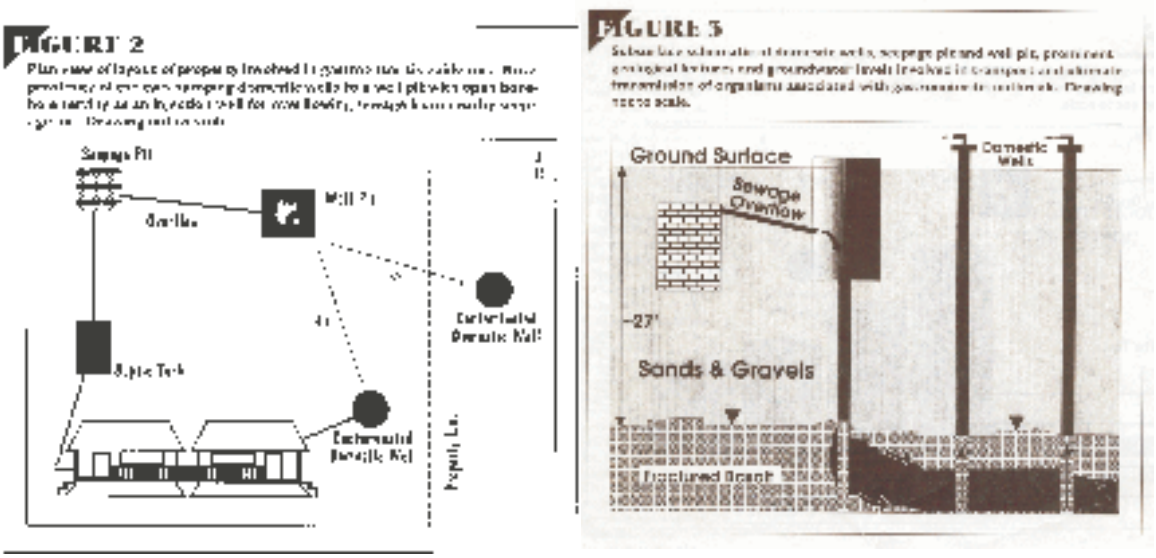
2. Without enforcement, there are severe economic penalties. Poor drillers make more money, while conscientious drillers lose the jobs to the low bidder. Many drillers want a level playing field and want IDWR to be tough on bad drillers, i.e. to enforce existing rules, rather than make new rules.

3. There should be greater cooperation between drillers and IDWR to avoid end runs around the rules.

4. Some well drillers expressed frustration and anger about other trades who damage wells.
    a. Individuals who install pumps and pitless adapters should be responsible for their work, as they may damage the well casing, well seal, or infect the well.
    b. The Plumbing Bureau should be responsible to inspect pitless adapters, since they are the last professionals who observe the well and trench before it is covered up.

CASE STUDY #3: BETTER SEALS AND DISINFECTION PROTECTS PUBLIC HEALTH

In 1994, five Idahoans became infected by *Shigella flexneri*, which causes bacillary dysentery [diarrhea, fever, nausea, vomiting, cramps]. 25 other Idahoans also became ill. On-site sewage was discharged into a pit, and nearby wells contained total coliform and *Escherichia coli*.



The Eastern Idaho Regional Office, IDWR, established more stringent requirements to seal wells in the fractured rocks of Island Park. Specifically,

1. All wells [domestic, stock and irrigation] must be overbored and cased to the depth from which water will be obtained.
2. The overbore must be at least 4 inches greater in diameter than the outside diameter of the casing used.
3. The annular space must be fully sealed with grout or bentonite from the bottom of the casing to the surface It may be necessary to pressure grout the well in order to achieve an adequate seal below the water table.
4. Water from different aquifers must not be allowed to commingle. Only one aquifer will be utilized.
5. All of the tools used down the hole must be disinfected with a chlorine [bleach] solution prior to leaving the job site.
6. Wells must be thoroughly chlorinated upon completion of construction and prior to use as a drinking water well.

Prior to the new standards, 37% of the culinary wells in Island Park contained coliform bacteria. After implementation of the higher standards, coliform infection in new wells is just 0.5% (one-half of 1 percent).

Sources: Idaho Department of Water Resources, News Release 2000-20, dated March 1, 2000 obtained from http://www.idwr.state.id.us.;
Van Every, L. R., and Dawson, S. D., 1995, Groundwater as a vehicle for disease transmission in Southeastern Idaho: A Case Study: J. Env. Health, v. 58, n. 5, pp. 16-19.

5. Some drillers wanted pre-arranged inspections, like the Washington state protocol, i.e. 24-hr notice. Others wanted random inspections, i.e., without advance notice to the driller. Drillers thought they should be responsible for compliance, but demanded IDWR check and police drillers and wells.

6. Drillers stated they paid $38 for plumbing and $45 for electrical inspections, and every well was inspected. They did not understand why IDWR could not inspect more wells for the $75 well permit fee.

7. What other issues should be considered in any revision to the rules?

Whereas the major topics above were identified across Idaho, stakeholders raised other issues. These include:

1. Monitor Wells. Drillers from Northern Idaho and Western Idaho and a Professional Geologist recommended changes in the current rules to address monitor wells.
    a. Idaho's rules should be revised to have a separate section on monitor wells.
    b. IDWR should adapt its current Well Driller's Report for monitor wells, as different information is important in monitor well drilling.
    c. Because wells are defined as least 18 ft deep, many wells <18 ft are installed, but IDWR has no record of these wells, either location, subsurface conditions, or construction details. [NOTE: the 18-ft definition of well is established at I.C. 42-230, not by rule in IDAPA 37.03.09.]
    d. A stakeholder recommends a separate fee structure for well permits should be implemented for monitoring wells and piezometers. At sites with many monitoring wells, perhaps a site monetary limit could be employed. [NOTE: fees are set by statute, not in IDAPA 37.03.09.]
    e. One stakeholder believes strongly that land owners *and* consultants must share responsibility with drillers for construction, maintenance and abandonment of monitor wells.
        i. Unlike most water wells, drillers often have little say in how, when, or where monitor wells are constructed. Yet, in Idaho, almost all liability is borne by the driller alone. For example, if a well is greater then 18 ft in depth (and therefore legally an Idaho well) but needs screen to the 10 ft level, the IDWR currently requires a waiver. He believed that any subsequent groundwater contamination, which might be the result of a shallow surface seal, is the liability of the driller alone. But a 17 ft well in the same spot with screen to within a few feet of the surface and almost no seal is no one's responsibility, since

it is, by definition, not a well. The rules provide the wrong motivation.

ii. Drillers should remain responsible for the proper construction of wells, within the constraints placed by consultants and on-site conditions.

iii. Consultants (who must now submit proposed well designs for monitor wells to the IDWR) should be responsible for the design and placement of wells.

iv. Once wells are constructed, there is no assurance that either the driller or consultant will remain involved with the monitor wells on a given site. The responsibility for maintenance and subsequent abandonment should fall to the landowner.

f. Stakeholders believed that 18 ft-well definition leads to problems. There are probably thousands of wells less than 18 feet deep that penetrate shallow water bearing zones across the state, and many are located at contaminated sites. These wells are potential conduits to aquifers. Stakeholder stated that it would be more protective of groundwater for these shallow wells to be known and tracked. Because shallow wells do not require permits, they have more potential to be orphaned or left without abandonment. [NOTE: the 18-ft definition of well is established at I.C. 42-230, not by rule in IDAPA 37.03.09.]

g. Most monitoring wells are drilled under the direction of a Professional Geologist [PG] or Professional Engineer [PE]. At present, the driller is responsible for proper installation of the wells, even though they are taking direction from the PG. Other states have a separate well driller's license provided to PGs or PE's who direct these projects. In those states, a test is required, which assures the state agency that the professionals know the drilling rules and regulations. At present in Idaho, a PG must sign and stamp the well completion schematic so the driller can obtain well permits. These dual responsibilities could be eliminated through a separate monitoring well drilling program that recognizes the professionals that are supervising the jobs.

h. A stakeholder observed that nearby states, such as Nevada and Oregon, have monitoring well drilling programs. Those programs would probably be good models if IDWR decided to initiate separate monitoring well programs.

i. Another stakeholder observed that the locations and depths of monitor wells must be determined or adjusted "in the field" and "on the fly." Unlike Washington State, currently IDWR expects to be notified of every well's design, depth, and location in advance and expects drillers to obtain approval for changes. Often IDWR people

can't be contacted from the field in a timely fashion, either due do the remoteness of the site or because no one is in the IDWR office.

2. PVC in domestic wells.
   a. Idaho's well drillers wish to see PVC as an approved casing. Currently, many drillers install PVC as a *liner*. Any revision to IDAPA 37.03.09 should clarify these uses.
   b. In Idaho, the rules should specify installation standards, as many drillers drop the casing into the hole ["air mail"], drill or saw cut openings, and use screws to join casing strings, all of which weaken the casing. Many drillers install Schedule 160 PVC casing.
   c. If the use of PVC casing was authorized in IDAPA 37.03.09, then well designers who specify PVC in municipal wells would not be required to seek a waiver from IDWR.

3. Construction of Municipal Public Water Systems without advance approval from Idaho Department of Environmental Quality. There were two parts to this issue:
   a. Many wells were drilled as domestic wells using the Start Card. However, the well provided water to commercial businesses and are *public water systems*. Stakeholders in IDEQ stated that the standard should clearly define a public water system and require well driller to ensure that the well is not a public water system if the driller wishes to use the start card.
   b. Well owners attempt to convert a well from one use to another, i.e., from irrigation to municipal. Stakeholders stated that the rules should clarify that wells for different uses have different standards, and those wells are not interchangeable.

4. Paperwork overload. A stakeholder raised the issue of reporting paperwork, both onsite and in the office. It is unnecessarily burdensome to the point of keeping drillers from more important matters, such as careful well construction.
   a. One solution for monitor wells is to discard the old multi-part generic forms in favor of a form specific to monitor wells. It would include important information, such as the name of the consulting company and their onsite representative. This information is not currently required on the IDWR drillers' report.
   b. In the future, start card, logs, etc. should be submitted in electronic form saving time and money on both ends. Now, some drillers transfer data from their computer system to paper, only to have the IDWR transfer it back into an electronic form. An on-screen review by IDWR for accuracy and omissions would be all that was necessary prior to database entry.

5. A Stakeholder, in written comments, suggested that any revision to IDAPA 37.03.09 should outline the driller's [or well designer's] responsibility for well completion. *Completion* is the selection of the method by which water enters the well casing to be pumped to the surface . The choices for well completion include
   a. open hole,
   b. open bottom,
   c. perforated pipe [e.g., Star or Mill knife, touch or saw cut, punched],
   d. louvered pipe,
   e. and manufactured well screen.

   The revised standard should require the well driller [or well designer, if different] to chose a well completion method based on the subsurface conditions and the design yield of the well. Thus, sand pumping could be reduced. Sand pumping causes the aquifer material to shift and settle around the well, which can cause flow across aquifers.

6. Stakeholders recommended that the revised standards should require that all components or parts installed in the well (and its associated parts and piping) be:
   a. Designed and manufactured specifically for water wells,
   b. Approved by NSF, ASTM, or API, and
   c. Installed in accordance with manufacturer's procedures and specifications.

CASE STUDY #4: ORPHAN WELLS

Wells are not generally the *cause* of groundwater contamination. Rather, unused, orphan, or damaged wells [or wells not built to current standards] may be a *conduit*. Currently, there are no efforts underway to identify, prioritize, and plug wells that degrade Idaho's resources.

Photographs from IDWR files.

HOW SHOULD THE WELL STANDARD BE REVISED TO PROTECT IDAHO'S GROUNDWATER?

During review of Idaho's Well Construction Standards and based on input from all stakeholders, several themes and ideas emerged as guiding principles for proposed revisions. If implemented during negotiated rule-making, revised IDAPA 37.03.09 should become clearer and more easily enforced. The protection of Idaho's groundwater should improve. Below is an outline of recommendations and suggestions based on stakeholder priorities:

During negotiated rule-making, what underlying goals should guide the revision?

To protect groundwater, any revisions must make the standard clearer and more easily enforced. Fundamentally, revisions to IDAPA 37.03.09 must:

Enforcement is a critical issue for Idaho's professional well drillers. Drillers realize that compliance with revisions to IDAPA 37.03.09 might require investments in new equipment. Drillers who make that investment fear that the Department will not enforce the new well standards.

■ Be *practica*l and *easily implemented* by Idaho's well drillers. If requirements imposed by rule are too complex or impractical, they will be ignored. Then, the validity of the entire process will be threatened. For example, any revision could be presented in a question-and-answer format, in tables, or using diagrams to illustrate well construction.

■ Be *results oriented*. The revisions must describe a desired result, based on real threats to Idaho's groundwater. The revisions should not arbitrarily prohibit any particular drilling methods or procedure.

■ *Allow drillers* [and well designers, when different] *to use professional judgement*. Each well is unique, and Idaho's well drillers must exercise their professional judgement and experience to accomplish the intent of the rules. Simply, no rule can envision every situation Idaho's well drillers will face. A revision to IDAPA 37.03.09 might allow implementation of regional standards.

■ *Hold well drillers, well designers, pump installers, well owners*, and others *accountable* when their actions cause a violation of the standard.

■ Must be *enforced*, fully and fairly. In the future, most stakeholders, including IDWR employees, hope that the Department will adequately enforce the revised standards.

■ *Incorporate all stakeholders*. Idaho's well drillers are a critical stakeholder in developing revisions to IDAPA 37.03.09, because they must implement any new requirements. However, other stakeholders have indicated that they wish to participate in negotiations, including the Idaho Department of Environmental Quality, Idaho Rural Water Users, Idaho Association of Cities, district health departments, and consulting geologists and engineers.

Based on other states, what specific recommendations might be adapted to Idaho?

Nearby states [e.g. Colorado, Washington, Oregon, and Nevada] have revised their well construction standards more recently than Idaho. The format and layout of rules in neighboring states may provide a starting point for revision. Of course, Idaho must adapt their ideas for our unique situation. Specifically,

1. The revised rules should be written in the active voice, clarifying who will perform the required act(s). For example, where appropriate, "The well driller [or designer] owner shall ...". This will enhance enforcement of the rules.

2. A revised IDAPA 37.03.09 should clearly place liability on any person who causes a violation of the standard, particularly if they are not licensed well drillers. The revised standards should apply to Professional Geologists and Professional Engineers who design and specify wells, pump installers who might infect wells during maintenance, individuals who destroy well casing and seals when installing pitless adapters, and well owners who fail to maintain their wells or separation distances from sources of contamination.

3. A revised IDAPA 37.03.09 should express clearly the intent of the standard. The Washington standard recognizes the obligation of the well design to protect groundwater, prevent contamination or waste, and meet the needs of the well's owner, if obtainable.

173-160-161 WAC 173-160-161 How shall each water well be planned and constructed? Every well must be planned and constructed so that it is:
(1) Adapted to those geologic and ground water conditions known to exist at the well site to insure utilization of any natural protection available;
(2) Not a conduit for contaminating the ground water nor means of wasting water;
(3) Capable of yielding, where obtainable, the quantity of water necessary to satisfy the requirements the user has stated are needed and for which the well water is intended to be used.

4. The rules should be reorganized to clarify the standards and procedures that apply to different types of wells, including
   a. single-family wells,
   b. irrigation wells,
   c. low-temperature geothermal wells
   d. public water supply wells, and
   e. monitor wells.

   Standards for the various types of wells could be illustrated in tables or charts. Other states [e.g., Ohio] have developed guidance documents for well owners and well drillers.

5. The standard should allow use of PVC as a well casing.
   a. Other states [WA, OR, MT] allow PVC when the surface is protected by steel casing [depth varies among states], is clearly marked as well casing, and complies with ASTM F-480, i.e., a standard adopted by the American Society for Testing and Materials.
   b. The standards in other states allow use of PVC based on its Standard Dimension Ratio [SDR].
   c. In addition, the Nevada standard specifies
      i. that PVC must be flush-threaded, threaded and coupled; or joined with nonmetallic couplings sealed with elastomeric sealing gaskets and thermoplastic inserted into grooves in the casing.
      ii. that the joint connections must not be glued, clamped, or otherwise damaged [i.e., fastened with screws].

6. The revised standard should require disinfection. At a minimum, the well should be disinfected when drilling is finished and whenever the pump is replaced [required in MT]. Disinfection should be a procedure, and a guidance document could be referenced. The driller or pump installer should not be required to collect water samples for bacteriological testing.

7. The standard should include a requirement to specify well completion. *Completion* is the selection of the method by which water enters the well casing to be pumped to the surface. Inappropriate or incorrect completion results in sand pumping, which causes the aquifer material to shift and settle around the well, resulting in flow across aquifers and destruction of the seal.
   a. The choices for well completion include open hole, open bottom, perforated pipe [e.g., Star or Mill knife, touch or saw cut, punched], louvered pipe, and manufactured well screens.
   b. The revised standard should require the well driller [or well designer, if different] to chose a well completion, based on the subsurface conditions and the design yield of the well.

8. The revised standard should require a *test* of the well. In other states, the method and duration of the test varies, based on the anticipated yield and purpose of the well. For example, irrigation wells require a different test than a domestic, culinary well.

9. A revised IDAPA 37.03.09 should require the plugging of orphan, unused, or damaged wells.
   a. In other states, plugging procedures are subdivided by type of well [e.g., cased, uncased, artesian, or dug well] and the well's compliance with current well construction standards.
   b. In Washington, the standard describes the methods of seal placement; e.g., sealing material placed below the static water level must be piped by tremie tube or by a dump bailer or tremie tube, but sealing material may be hand poured above the static water level, provided the material does not dilute or segregate, and the resulting seal is free of voids.
   c. Nevada's well standard addresses plugging. For example,
      i. If a permit, waiver or application to appropriate water from a water well is canceled, abrogated, forfeited, withdrawn or denied, the well must be plugged
      ii. If the person who last drilled or used the well does not plug the well within 1 year, the person who owns the land on which the well is located must plug the well.

10. The revised standard should require only the use of components or parts that have been designed and manufactured for water wells, are NSF, ASTM, or API approved, and are installed in accordance with manufacturer's procedures and specifications.

11. The revision should include minimum casing diameters for various flow rates [in gpm]. While recommended, the standard should be flexible and allow use of professional judgement and experience.

12. A revised IDAPA 37.03.09 must include a revision and reorganization of well seals. The standards for seal should be organized as follows:
   a. General Standards. This include seal materials, such as bentonite and cement, and installation methods.
   b. Surface Seals. Generally, at least 18 ft below grade and an annulus 2 in. greater than the well casing.
   c. Formation Seals. These are designed to prevent subsurface flow between aquifers.
   d. Special sealing requirements for artesian, dug, driven, jetted, and dewatering wells.

If Idaho re-organizes its rules by type of well [i.e., single-family, irrigation, public water supply, geothermal, and monitoring], the revisions might be drafted to address sealing requirements of each type of well. This could be accomplished by using a table, a matrix, or illustrations.

Are there management recommendations that could protect groundwater resources now?

1. IDWR should pool resources to protect groundwater.

   Whereas Idaho Department of Water Resources has primary responsibility for the well standards at IDAPA 37.03.09, it is not the only agency responsible for protecting Idaho's groundwater resources and the public health of its citizens. Many stakeholders, including members of Idaho's legislature, suggested that all agencies must work closer together. Two examples:

   a. Areas of nitrate contamination, aquifers containing elevated arsenic, and other hydrogeologic peculiarities have been identified across Idaho, and it is clear that a "one size fits all" approach will not be workable. To address these issues, IDWR should continue to increase its use of the technical resources at IDEQ and geologists at universities and in private practice. These additional resources will help IDWR provide information that drillers will need to design and construct wells in these areas.

   b. IDWR should continue to develop well standards and regulations in Areas of Drilling Concern and in contaminated areas. In these areas, the Department should continue to require permits to drill, rather than Start Cards.

   c. IDWR, District Health Departments, and IDEQ should pool resources to locate orphan, unused, or damaged wells [e.g., map each's location using GPS] and develop priorities for plugging these potential pathways for contamination.

2. IDWR should implement a pilot program to coordinate well siting.

   a. Idaho Department of Water Resources should more closely coordinate well drilling between IDEQ, District Health Departments, and Idaho's professional well drillers. When soliciting stakeholder involvement, the Panhandle Health District [PHD] described the challenges it face in northern Idaho; i.e., rapid population growth, large numbers of small, lake-front lots, and sensitive environmental

setting. This combination means there are limited locations for both wells and septic tanks.

b. The Panhandle Health District offered to develop and implement a pilot program to coordinate well and septic tank siting. The cooperative program would develop management procedures and mechanisms to resolve well-septic tank siting issues before expensive conflicts arise. At the end of the pilot period, it might be a model that could be applied across Idaho.

3. IDWR should establish regional advisory committees.

At the regional level, the Department should established advisory committees to make recommendations to IDWR's Regional Manager regarding regional standards for unique geological situations. The regional advisors might identify geological settings where deeper surface seals or formation seals might be required. Case Study #3 is an example of regional well standard, the implementation of which had a immediate, dramatic effect on public health and on the protection of groundwater resources.

The regional committee should be composed of local well drillers, environmental health specialists, and geologists and engineers from IDEQ, IDWR, universities, and the private sector. Thus, professionals most knowledgeable about local geologic and drilling conditions could recommend immediate, practical solutions to the challenges Idaho faces.

APPENDIX

Below are selected notes and records of meeting with Stakeholders across Idaho.

Coeur d'Alene Stakeholder Meeting

This is summary of the stakeholder meeting held on May 5, 2003, at the ITD conference room, 600 W. Prairie, Coeur d'Alene, Idaho. The meeting commenced at 7:00 PM and adjourned at 9:30 PM. 10 stakeholders, all of which were licensed well drillers, signed the record form, but 11 attendees were present. The following is a summary of viewpoints expressed, listed in the order recorded on the flip chart.

1. A driller observed that the number of rules had gone up, but the manpower in IDWR committed to drilling had gone done. It is the wrong trend.
2. A driller observed that the rules create an "us" verses "them" approach.
3. A driller raised the issue of monitor wells.
    a. He stated that these wells are different, controlled more tightly by customers who are typically engineers or geologists with specific purposes.
    b. Eighteen foot definition results in 17.5' holes which may not be desirable.
    c. Rules should have a separate section on monitor wells, like Washington, because of their unique nature.
    d. Owner and well driller should share responsibility for well maintenance, repair, and abandonment.
4. Several drillers questioned whether there are problems with the rules as written and suggested that rule changes should be driven by real problems or real science that merits change. A stakeholder stated emphatically that rules need to remain flexible and make sense.
    a. Must allow drillers to respond to site-specific conditions.
    b. Drillers don't want "one size fits all" approach.
    c. Drillers believed in fewer rules, unless scientifically justified.
    d. Drillers wanted more "case by case" flexibility.
    e. Drillers wanted to see more justification for rules, either a scientific justification or a real-world problem.
5. Drillers put in seals that others [pump guys] destroy. Revisions must add requirement that driller's liability for seal ends when someone else compromises the seal.
6. Drillers debated the rules on seals as currently written.
    a. 2 in. annular space vs. 4 in. annular space.
        i. Most thought 4 in. was minimum, same as WA, OR and MT.
        ii. One driller thought 2 in. was enough.
    b. If pitless was at 6 ft, then 12 ft of bentonite below pitless was enough.

c. Some drillers thought they shouldn't get worked up over pitless, rather set good seal below pitless.
d. Drillers agreed older well seals were problem, not seals in new wells.
e. Seal requirements that do deeper than 18 ft don't fill all circumstances, i.e. wells drilled into clay or granites.
f. Drillers also debated if ring-bits actually created even a 2 in. annular space [i.e., 1 in. on each side of pipe].
g. Enforcement requires bigger annular space.
    i. 1 in. space [2 in. overall] is not big enough.
    ii. Pouring flakes won't make a good seal. Gets wet and sticks to pipe.
h. IDWR should enforce rules against unlicenced drillers. There was some debate about a hand dug well >18 ft installed by a home owner. No driller was required.

7. Enforcement.
    a. Drillers said new rules don't make sense if existing rules aren't enforced.
    b. Drillers said need more enforcement, less rules.
    c. Drillers want level playing field.
    d. Drillers want IDWR to be tough on bad drillers, i.e. enforce existing rules.
    e. Drillers suggested assigning liability, instead of making more rules.
    f. Need greater cooperation to avoid end runs.
    g. Drillers wanted inspections, like the WA protocol, i.e. 24 hr notice. Others wanted random inspections, i.e., without advance notice to driller.
    h. Drillers thought they should be responsible for compliance, but demanded IDWR check and police driller and wells.
    i. Drillers stated they paid $38 for plumbing and $45 for electrical inspections, and every well was inspected. They did not understand why IDWR could not inspect more wells for the $75 fee.
8. A driller stated at CO rules allow different well standards for different geology. That option and the pros and cons were debated.
9. Perception. A driller stated that Idaho's driller had a perception problem.
    a. IDEQ, Health Departments, cities, and water purveyors percieve that wells were going in willy nilly, causing septic conflicts, and contamination.
    b. Cooperation with Health Department should be improved. Drillers suggested early health department involvement.in well siting on smaller lots and lake front locations makes great sense but makes less sense for large lots where well siting conflicts are less likely.
    c. Driller's debated who should be responsible for siting with some drillers willing to accept greater responsibility and others suggesting homeowners must accept responsibility. Some responded positively to the Washington model of joint responsibility of drillers and

owners. .

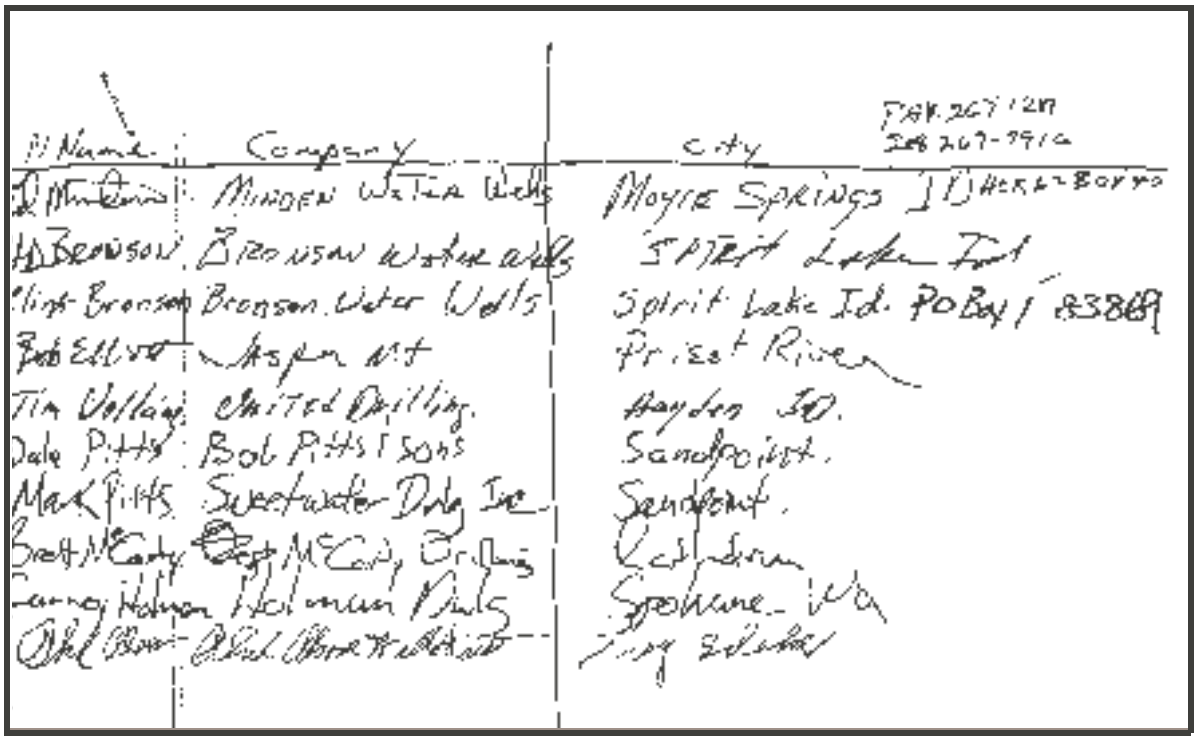
d. A driller proposed a more comprehensive start card, requiring a homeowner sign off on septic tank locations prior to driller submitting start-card.
e. Drillers stated that local government should provide homeowners more help.

10. PVC in domestic wells was debated.
    a. There was some debate on use of glue and its potential toxicity.
        i. Most thought the use of PVC "liners" in domestic wells was acceptable.
        ii. One driller thought use of glues in monitoring wells would create detections of contaminants and therefore suggested the practice might have negative environmental consequences in other wells.
    b. Installation technique was debated.
        i. Most accepted the practice of "air mail" but others after the meeting expressed problems with "air mail" as resulting in damaged or compromised pipe.
        ii. Drillers expressed surprise that drilling, screwing, and saw cuts are not in compliance with manufacturers suggestions or NGWA recommendations.
    c. One drillers stated that PVC Schedule 160 was not a problem, had been installed for years.
11. Disinfection.
    a. A driller stated that professionals should use only potable water and should disinfect all wells when leaving completed well.
    b. Drillers pointed out the pump installers should disinfect, too.
    c. Drillers generally agreed that they would support disinfection, as cheap, easy, and evidence of professionalism.
    d. One driller observed that since most drill steel and casing are stored in unsanitary conditions in outdoor yards, it made sense to require disinfection.
12. Well Abandonment.
    a. Abandonment should distinguish between old, out-of-standard wells and wells completed to current standards.
    b. Priority should be given to wells that are not trustworthy or proving to be a problem.
13. 10 State Standard.
    a. Drillers stated that IDWR's 0.25 in. wall thickness is OK and schedule 40 requirement for 6 in casing seemed arbitrary, given the inconvenience of stocking this pipe.
    b. Before enforcement or changing the standards in IDWR rules, drillers wanted evidence of good scientific or engineering rationale to justify any change.

14. Drillers said they wanted to be kept in the loop regarding suggested changes and input from other stakeholder groups and other parts of the state (i.e., they want to stay informed and have some forewarning of trends that might later turn into imposed restrictions or rule changes).
15. Drillers said that in general current rules could be more clearly written but are working in general and must set good minimum standards that apply statewide. They don't want rules that solve location-specific problems by blanketing the state with requirements that make sense in some conditions but not in others. (.e.g. requiring 58 foot of seal in unconsolidated alluvium with 1 inch of soil.) Drillers said that
    a. rules are working in general.
    b. any changes must set minimums, but
    c. flexible to allow location-specific problems without blanketing the state.
16. Meeting evaluation.
    a. What worked:
        i. Drillers said they appreciated the opportunity to have the floor, to have their say;
        ii. Were confident that their input would be used and appreciated being asked for it;
        iii. Were grateful just to have the meeting.
    b. What didn't work:
        i. The meeting was too unstructured, took too long on some topics not enough on others.
        ii. Too much repetition (particularly concerning seals);
        iii. Earlier notice of meeting and opportunity to earn more CEUs for attendance would have been better;
        iv. Wanted to hear more examples of problems from other stakeholder groups.

Off Topic Issues

A. Continuing education credits should be available in 8-hour blocks.
B. Accountability of where $75 goes and why its not going into enforcement.



Stakeholders at Coeur d'Alene Meeting, May 5, 2003.

Idaho Falls Stakeholder Meeting

This is summary of the stakeholder meeting held on May 7, 2003, at the AmeriTel Hotel, Idaho Falls, Idaho. The meeting commenced at 7:00 PM and adjourned at 9:30 PM. 39 stakeholders, all but two of which were licensed well drillers, signed the record form. The following is a summary of viewpoints expressed, listed in the order recorded on the flip chart.

Mike Hart opened the meeting, introduced himself and Jim Rush, laid ground rules for the meeting. Jim Rush outlined major topic areas for input.

1. Well Seals. The issue of well seals was discussed first, and below is a summary of major points.
   a. Surface Seals.
      i. One driller said that all seals should be set to 100 ft, like UT.
      ii. Some areas need different seals, based on geology, and separate zones [aquifers] need to be sealed.
      iii. Enforcing existing rules first is more important, and changes don't make sense until rules are enforced. A driller said that more enforcement before more rules.
      iv. A driller believed that evidence or proof of a problem is required to justify rule changes.

v. Well drillers are professionals and know how to properly seal wells for given conditions.
vi. Rules should allow professional judgement, as rules cannot cover all conditions and each well is different.
vii. Using blanket standards for well seals would not be appropriate. A driller quoted IDAPA 37.03.09.025.01 as a reasonable rule.
viii. Some Health Departments are setting their own standards, as the health departments don't trust IDWR.
ix. There was a consensus that special rules [like Island Park] can address specific problems as the problems arise.
x. Each area is different, and state can't apply single standard.
xi. Drillers asked what good is 18 ft seal if other excavations are open below 18 ft. For example, open pits, sewage excavations, horizontal borings

b. Aquifer Sealing. Jim Rush outlined concerns of IDEQ about co-mingling aquifer waters. Below is a summary of stakeholder concerns.
i. Mixing of aquifers should be allowed to provide land owner access to appropriate water.
ii. Separation of zones requires understanding of subsurface geology. Sealing subsurface zones without understanding doesn't make sense.
iii. Nature co-mingles water, and drillers can't prevent that.
iv. Deep seals don't make sense, as water bypasses seals as it flows through fractured rocks.
v. When power goes out, chemicals are sucked into irrigation wells, as most don't have backflow preventers.
vi. Wells are not biggest threat to groundwater; probably not a threat at all.
vii. Drillers want more coordination between agencies. For example, ITD excavates gravel and leaves large pits directly connected to groundwater.
viii. Horizontal boring needs to be done by licensed well drillers. UT has horizontal tunneling code requiring licensed drillers.
ix. Areas of drilling concern can catch areas [like nitrate contamination areas] where cascading water is a problem.

2. Abandonment. Jim Rush explained that other stakeholders are worried about unused wells that are open for contamination.
a. Drillers said that plugging should focus on older wells.
b. Plugging of wells built to current standards should be a second priority.
c. Forcing the plugging of unused well is touchy, as it is a property-rights issue.

d. Drillers should be able to demand well plugging when replacement well is drilled.
e. Drillers said that Congress should help provide money to plug wells.
f. Plugging with cement may introduce contamination.
g. Concrete shrinks, and bentonite should be added to ensure proper plugging.

3. Well Siting. Jim Rush introduced the topic of well siting. How do we get wells and septic tanks on small lots? Stakeholders said
   a. Siting needs to be on plat.
   b. Planning and Zoning committees need to understand the conflict between wells and septic tanks, especially on small lots.
   c. Rules should pass liability for well siting to P&Z and to land owners.
   d. A driller reported that he had to pay to move a well. His lawyer said that the current rules make the driller responsible for meeting all set back.
   e. Set back could be handled by installing deeper seals, so that the 100 ft setback is achieved by a well with a 100 ft deep seal.

4. Disinfection. Jim Rush introduced the topic by reporting that 35% of new wells had bacteriological contamination, and Well Standards only recommend disinfection.
   a. A driller reported that UT requires disinfection.
      i. Potable water should be used.
      ii. UT Well logs ask if you disinfect.
   b. Disinfection needs to be reasonable and appropriate, not overkill. Steam cleaning would be too much.
   c. Disinfection must be justified with some science, not just a number.
   d. Need better bacterial testing to ensure that hits are real, not artifacts.
   e. If health department reports 35% contamination, then the cause should be determined.
   f. One driller said that aquifer contamination is more of an issue than dirty wells from driller, plumber, or electrician.
   g. There was general agreement that disinfection is a reasonable requirement at end of well installation.

5. Plumbers and Pitless Adapters. The stakeholders were adamant that sealing and disinfection don't make sense when plumber puncture pipe or ruin seal.
   a. Well permits should be required to perforate a well casing.
   b. Plumbing inspectors should make sure pitless is installed correctly; they get a $38 fee.
   c. IDWR must coordinate with plumbing inspectors to ensure proper installation of pitless.
   d. Only drillers and electricians should puncture the well casing.

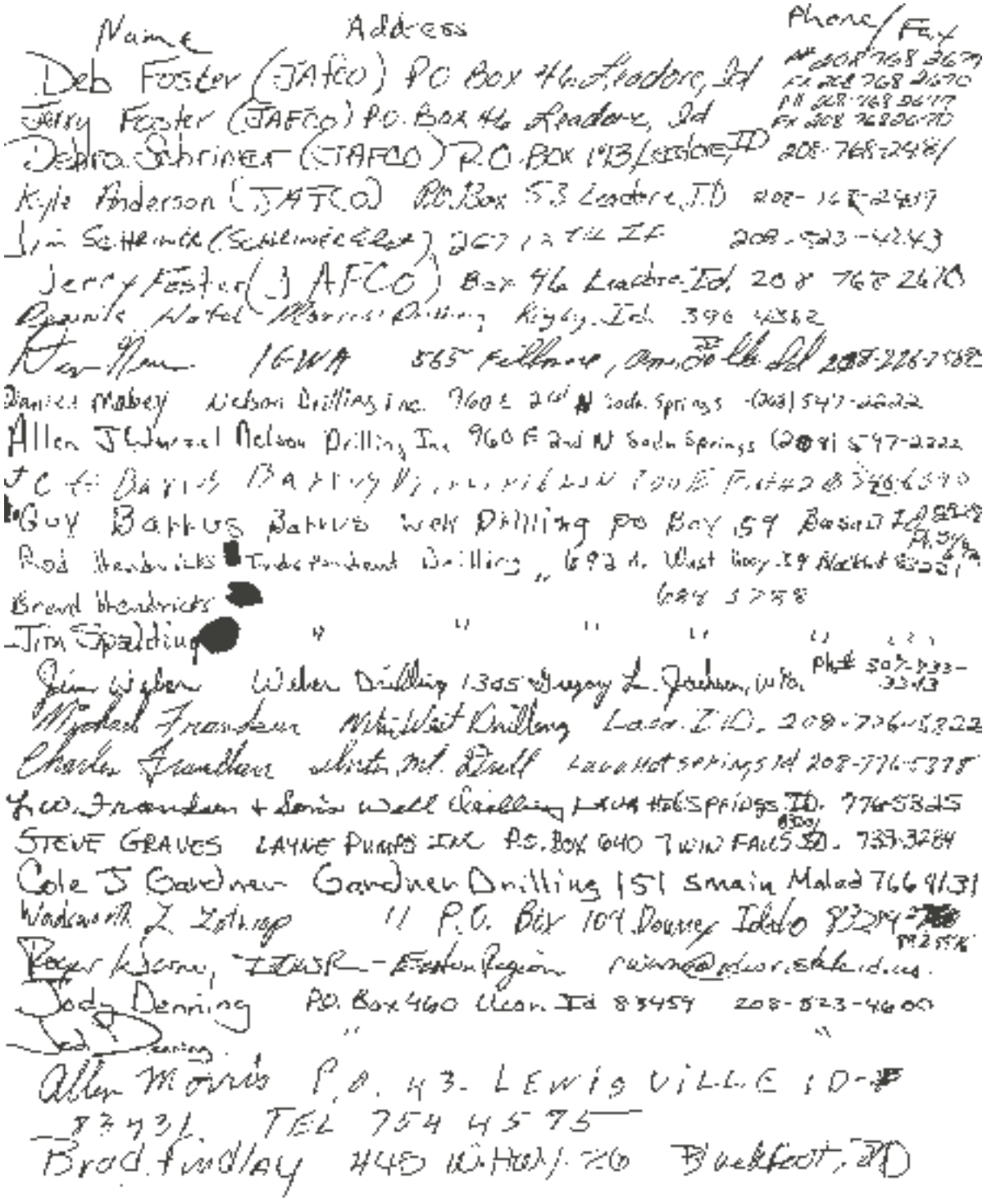
e. But, plumbers should not inspect well completions.
f. Some drillers thought we had too many license requirements now.

6. Well Owner Responsibilities. Jim Rush introduced the subject of the responsibilities of well owners. When the well is finished, who is responsible?
   a. Drillers said nobody should cut or disturb a well except a licensed well driller.
   b. Well owners need to be informed of proper maintenance and know their responsibilities.
   c. If a well owners wants a well in a contaminated aquifer, driller shouldn't be responsible. IDWR needs to hold landowner responsible.

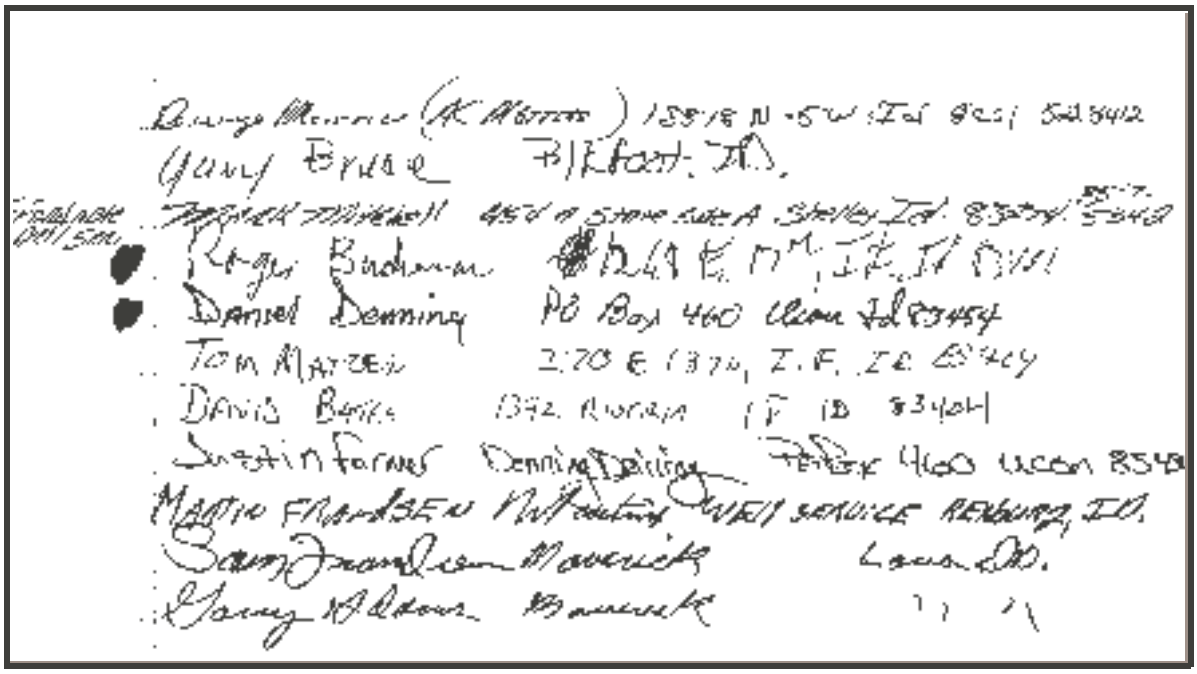
7. Enforcement. The topic of enforcement was discussed.
   a. A driller said that well inspections need to include random seal inspections with higher frequency for bad reputation drillers. E.g., 10% for all drillers; 20% after one problem; 30% inspections, and then out of business.
   b. Each IDWR region should have standard # of inspections to ensure proper well completion.
   c. Current inspections look only a surface of finished well, but should do more thorough inspections from time-to-time.
   d. A driller said that 10% of all wells should be inspected.
   e. Enforcing clear, uniform rules creates level playing field for all drillers.
   f. Enforcement includes education, brow beating, and fines.

8. General Comments.
   a. Need good science to back up need for more or changed rules.
   b. Don't add more rules, as rules mean more government supervision.
   c. One driller like WY rules, as they were simpler.
   d. Heat pumps backflow down the well and cause groundwater contamination. IDWR should stop this practice.
   e. IDWR should employ journeymen well drillers [like the plumber's and electrical bureaus] to inspect and regulate wells.
   f. IDWR has primary responsibility for wells, and counties and health departments should not set their own standards.
   g. A driller said that there needs to be clear lines of responsibility between agencies, to coordinate and eliminate ambiguity.
   h. A driller said IDWR is doing its job and well drillers need to do more, or well program will be taken over.
   i. Well drillers with lower standards cause most problems, i.e. drill too close too canals, drill shallow wells into contaminated aquifers.

j. Start cards could be used to educate drillers on areas of drilling concern, known problem areas, etc.



Attendees at Idaho Falls Stakeholder Meeting, May 7, 2003. Page 1



Attendees at Idaho Falls Stakeholder Meeting, page 2.

Boise Stakeholder Meeting

This is summary of the stakeholder meeting held on May 9, 2003, at the Holiday Inn, Boise, Idaho. The meeting commenced at 7:00 PM and adjourned at 9:30 PM. 48 stakeholders signed the record form. There were two PE or PGs in attendance. The following is a summary of viewpoints expressed, listed in the order recorded on the flip chart.

Mike Hart opened the meeting, introduced himself and Jim Rush, laid ground rules for the meeting. Jim Rush outlined major topic areas for input.

1. Low Temperature Geothermal Wells. The standards for these types of wells were discussed first.
   a. Some stakeholders observed that the 85° F limit is too low. It should be raised to parallel OR at about 200° F or at least 100-120° F.
   b. A stakeholder observed that geosource wells were not regulated in TX. Wells were 300 ft, drilled with mud, no casing.
2. Monitor Wells.
   a. One stakeholder observed that monitor wells should have their own, separate section of the rules and special license for monitor well drillers.

b. Another stakeholder observed that standards should be the same as cold water wells.
c. Stakeholder observed that monitor wells were controlled by engineer or geologist, not drillers.
d. One stakeholder observed that driller had too many licenses now and that monitor wells did not need another licences.

3. Wells Seals.
a. 18 ft is enough, if enforced.
b. Seal should be set to first confining layer.
c. Lots of unconfined areas, and seals in unconfined areas with highly permeable beds don't make sense.
d. Seals should be specific to geology: no one size fits all situations.
e. Minimums are fine, but drillers needs to be allowed to use professional judgement.
f. In some situations [e.g., lava tubes at 25 ft], bentonite top seal not possible, but bottom seal is critical in some cases.
g. Concrete grout shrinks, not reliable.
h. Pressurized wells need concrete, so don't eliminate it.
i. API standard for cement should be used.
j. Continuing Education is good for driller knowledge.
k. Rules should be tightened to ensure use of appropriate sealing material
l. Seals should be left to driller to decide.
m. Cross-contamination of aquifers is geology specific-seals should be addressed if and as appropriate for those conditions.
n. In OR, pressure cement used, but driller should decide in such cases.
o. Individual drillers have information or need to be informed about areas of possible cross-contamination, and then use their professional judgement.
p. IDWR should do studies to verify problems; back up proposed rules with science. [Large vocal agreement on this point.]
q. Wells already penetrate contamination, but wells are not the source of the problem.
r. Areas of Drilling Concern [ADC] could identify areas where contamination is a problem.
s. However, drillers don't want the entire State of Idaho to become on big ADC. ADC should be based on science.
t. A driller reported that the PCE problem in Boise was caused by the pumps, not contamination of aquifer.
u. The costs and benefits of more regulations need to be considered.
v. The 18 ft seal should be installed below pitless. If there was seal below pitless, no need to worry about bentonite above pitless.
w. Seal rules need to make sense, as the trench from well to house has no bentonite in bottom. Why seal a well when contaminants can leak through trench.

x. Proper sealing is important, leaving 10 ft in place below pitless is acceptable, but let driller decide if seal should be set to confining layer. [Strong verbal support for this idea.]

4. Well Siting.
   a. Driller doesn't need to take responsibility for septic tank.
   b. A stakeholder said that drillers should coordinate with health department to ensure wells are not in conflict with septic tanks.
   c. Subdivision plats need to specify well location, but with some flexibility.
   d. Set backs are related to horizontal distances, but the vertical distance should be considered. e.g., a well with a 100 ft seal is still 100 ft vertically from septic tank.
   e. Groundwater gradient is more important. For example, a well is better 50 ft UP gradient than 100 ft DOWN gradient of a septic tank. Gradient may not be answer, as pumping can change gradient.
   f. Depth of well should be a factor, as a 300 ft deep well with seal might be set closer to septic system.
   g. New septic tanks [e.g., evaporation] may reduce need for setback or reduce distance.
   h. Because septic tanks contaminate aquifers, not wells, the location of septic tanks need to be more accurate.
   i. Just pacing off distance not enough accuracy.
   j. If Health Department is given a link in the chain, it will just delay drilling and add costs.
   k. Well drillers should not be liable if it not their fault, but someone else's fault.
   l. Yard Hydrant should be set back from well head, to avoid pathway to aquifer.
   m. Inactive or abandoned septic tanks need to be clearly addressed or identified to avoid conflict.
   n. Driller should know if he comes before or after septic tank guy. Second guy has the full responsibility to meet set back standards.
   o. Professionals need to take appropriate action, even if we have to expose [excavate] septic system.
   p. Homeowners must take responsibility for well location and data on septic tanks and other issues that cause conflicts.
   q. Location of septic tanks needs to be more visible.
   r. Access to well must be provided to allow future maintenance.
   s. Rules should address other big holes that provide pathways to contaminate groundwater, e.g., big holes or excavations. These make surface seals pointless.

5. Disinfection.
   a. Disinfection should be required before pump installation. Last guy to touch the well should disinfect.
   b. Disinfection is not necessary with air rotary, as cutting scour inside of

pipe.

c. Bacteria may be in well one year after installation, so it is not the installation.

d. Bacteria may be activated by presence of well, but not caused by well installation.

e. When stakeholders were informed of the 35% positive tests on new wells in Eastern Idaho, the response was adamant. Better testing and training for health district personnel is required, before more rules imposed on drillers.

f. Regulation recommending disinfection is fine, leave it to driller's discretion.

g. Chlorine eats casing, so driller should use care. [Thicker wall pipe roundly rejected.]

6. Well Owners Responsibilities.
   a. Changes to well should only be done by licensed well drillers.
   b. Well owner must also accept responsibility for changes to well.
   c. Well Owners need education.
7. Enforcement.
   a. Enforcement personnel need minimum training. Perhaps should be journeymen well drillers.
   b. Areas are too big for IDWR to cover.
   c. IDWR may need more $$ to cover entire state.
   d. Enforcement needs to be done against non-drillers who mess with wells.
   e. Without uniform enforcement, bad drillers make more $$ and good drillers lose jobs.
   f. IDWR should target bad or poor drillers and not good drillers.
   g. Come down hard on bad drillers.
   h. Need driller support for IDWR's enforcement.
   i. The stakeholders debated plumbing and electrical inspectors:
      i. Advance notice is required, so plumbing and electrical inspectors can be on-site.
      ii. The fee is lower for plumbing and electrical inspectors, and why IDWR cannot inspect was repeatedly asked.
      iii. Plumbing bureau should be responsible to inspect pitless adapters, since they are professional who see well head before it is covered up. Plumbing Bureau people must be trained and qualified.
      iv. For IDWR, inspections must be performed during drilling [or sealing] rather than looking at completed well head.
   j. Utah requirement is observe all seals is too burdensome and not wanted here.
8. Well Abandonment.
   a. When a replacement well is drilled, IDWR should examine situation to see if old well is still good or should be replaced.

b. State should estimate and state design life on each well permit, so owner knows when it should be plugged and replaced.
c. There was debate if the well owner or IDWR had responsibility to determine if well(s) should be plugged.
d. Owners should be required to disclose and plug old wells and sign well permit or start card.
e. During drilling, a driller should inventory property to see if there are other wells on the property. One driller notes the extra wells on the permit or log.
f. In some geologic situations [low yield aquifers or aquifers with poor water quality], there may be good reasons to have more than one well.
g. If driller doesn't get plugging job, then owner needs to sign start card that owner will plug well later.
h. Sealing of new wells doesn't make sense if old well with bad or no seal is leaking contaminants to groundwater.

9. Other Issues. These are issues not specifically addressed by IDAPA 30.03.09.
   a. IDWR should allow [require] farmers to use high nitrate groundwater for irrigation, to recycle and reuse the contaminant.
   b. How is the driller's fee used? Where did the increase go?
   c. Driller will protect groundwater, and the obligation to protect should be imposed on all people who excavate or drill. The exemptions to the license rules were discussed, including:
      i. The 18 ft definition means other holes can contaminate groundwater, but are not regulated.
      ii. Creosote piling driven >18 ft and into water can cause problems.
      iii. Injection wells along highways.
      iv. Barrow pits.

Name	Address	Phone/FAX
Gary Duspiva	25050 Pet Ln Parma Idaho 83660	208 722 5309 P&F
Dale Dickson	21687 ... Caldwell ID	208-337-6549 [redacted]
Larry Weeks	920 ...	208-478-4577 Fx ...
John R. Courtney	2537 N 2700 E Twin Falls ID	208-655-4236
Pat Courtney	2537 N 2700 E Twin Falls ID	208-655-4232
Jehn D. Courtney	2700 E 3424 N T.F. ID	208-655-4339
Larry E Weeks	613 E 46th Boise ID	208-375-4644
Gary E. Cooper	5801 Floating Feather Eagle	208-939-6085
Runne ...	Homedale ID	208-337-4438
Ron Elkins	Twin Falls Id	208-733-5002 734-1863
Derek Young	720 Park Blvd Boise ID 83712	208 386-5720
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Rich Skiodrek	10400 Overland Rd Boise, ID 83709	208 866 0359
Scott Church	192 Crystal Dr	208-434-8847
Gary Toms	610 Emmett Rd.	208 398 8518
Terry W. Wilson	608 W Karcher	463-1524
Kay Wilson	608 W Karcher	463-1524
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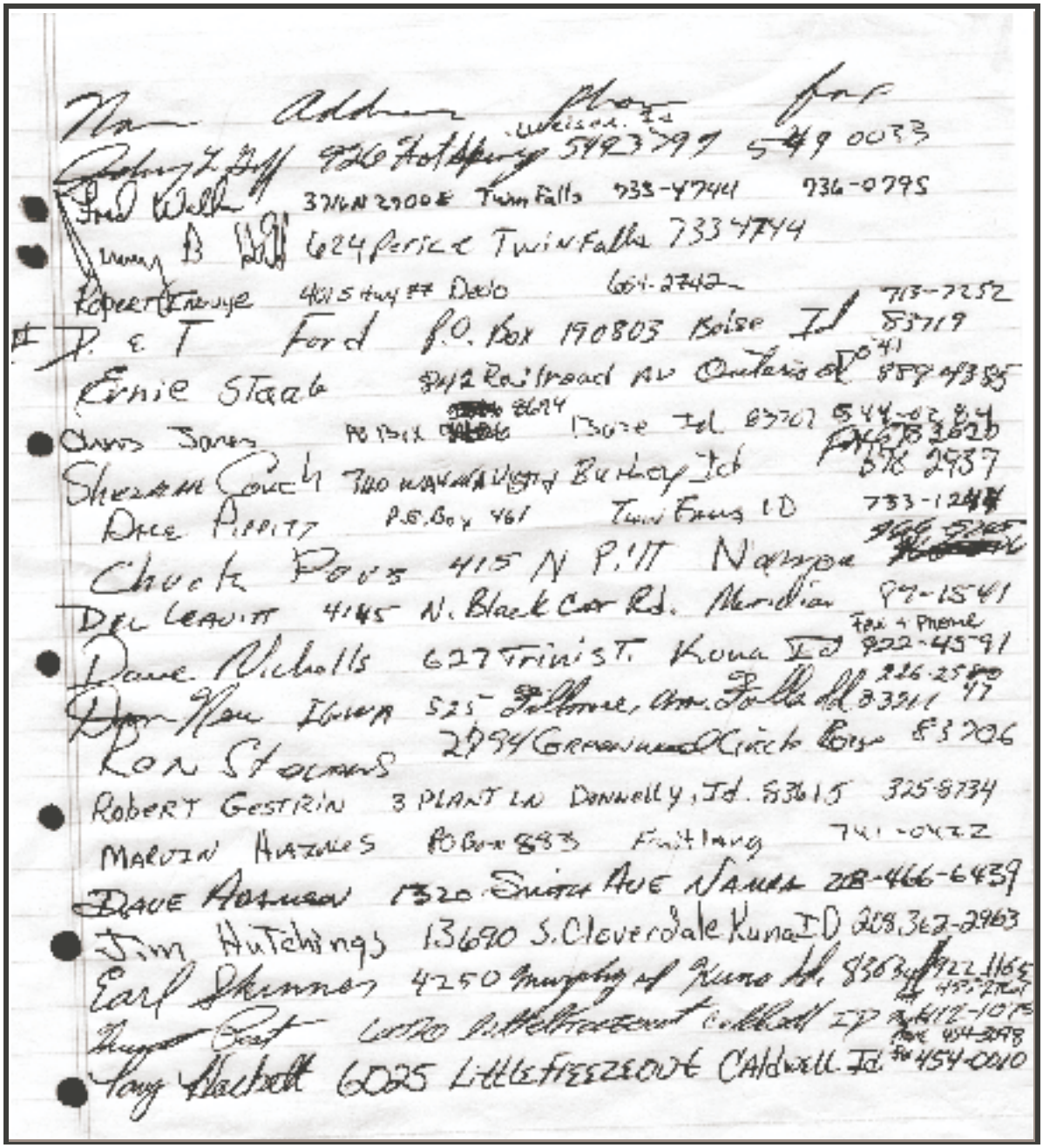
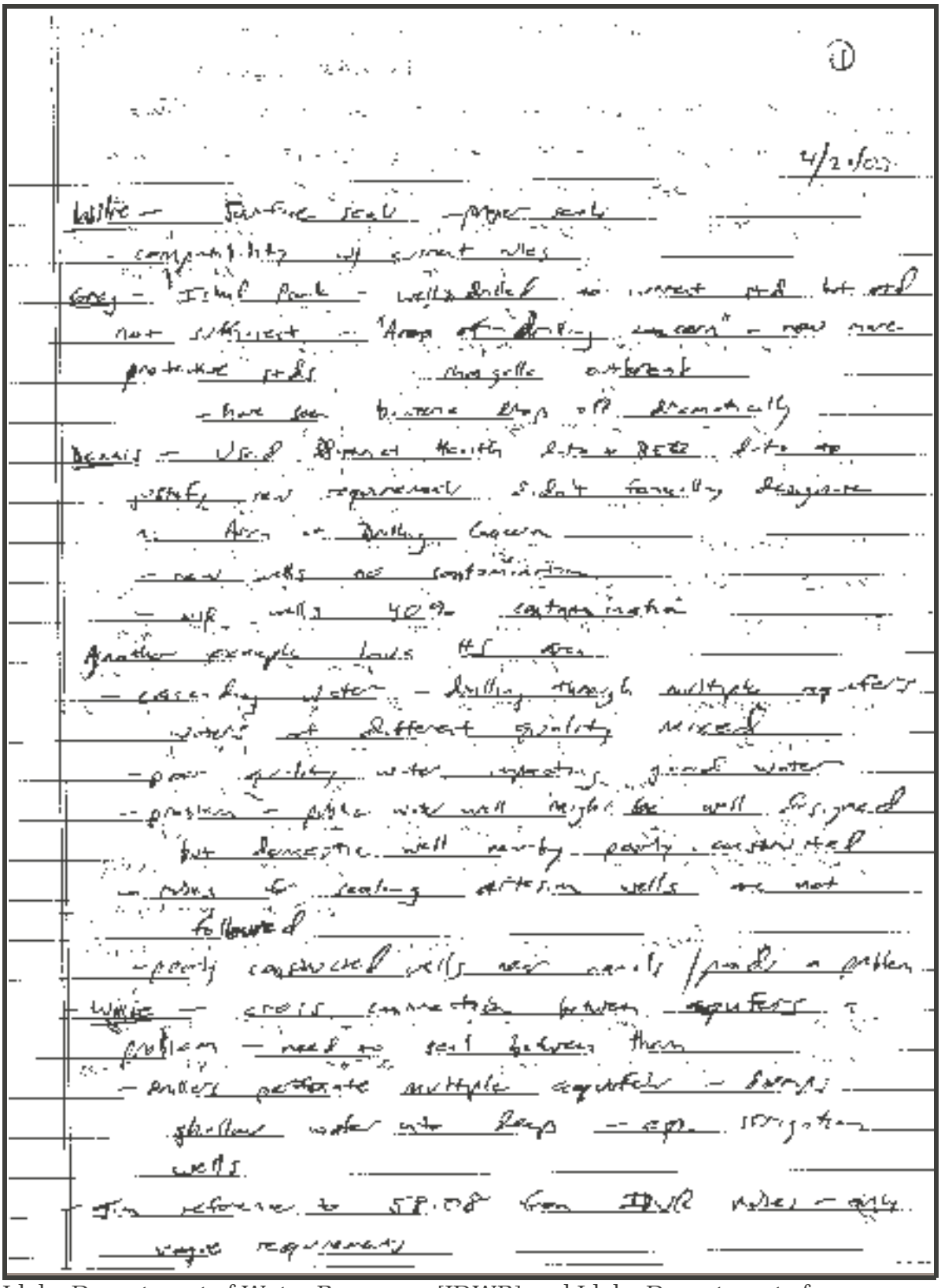
Marc Schmidt	Rt 1 Box 1115 Fairfield	539-0092
Frank ...	4145 N. Beach ... rd ...	888-7610
H. David Nicholls	105 So Butte Ave Emmett Id	365-5735
Ken Smith	328 Glendale Rd Bellevue Id	788-3199
Dave ...	3625 N 3300 E Kimberly	733-2442
Hugh ...	7425 W. 36 S. Mtn Home	832-2241
David Rogers	6066 Saratoga Boise 83706	[redacted]
Robert P Jones	3328 Sand D. Boise	385-0151
Winston Inouye	1823 950 E Deal	667-2847

Attendees at Boise Stakeholder Meeting, May 9, 2003; page 1



Attendees at Boise Stakeholder Meeting, May 9, 2003; page 2.



Idaho Department of Water Resources [IDWR] and Idaho Department of Environmental Quality [IDEQ] Stakeholder Meeting, April 20, 2003; page 1.

Willie – problem w/ drillers using domestic that could be public water wells federal 15 connections 25 people

– recommends definition of public water system + public water supply well (>10 dwellings)

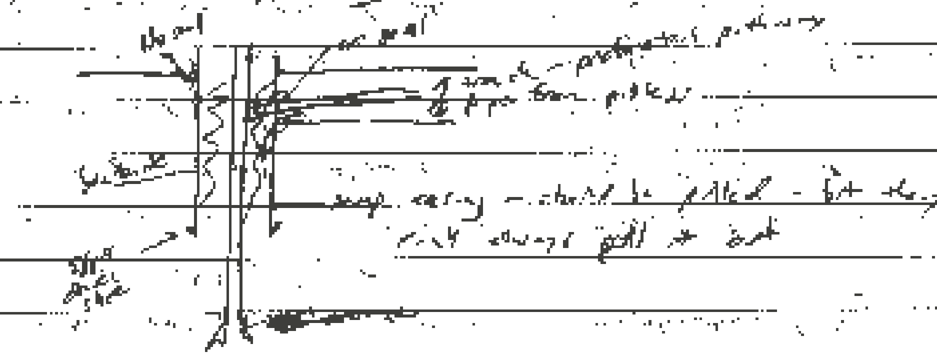
↳ (ID code) be put in IDWR rules

Dennis + Willie

– would like to see stronger discussion of formation seals vs surface seals

Dennis – shallow drive method – temp between surface casing + production casing + call it a surface seal

– but put pitless through the surface casing leaving an incomplete seal



Group – Definitions in statute of public water supply flexible

– less than define anything a public water supply if there is a public health threat

I asked how driller is to know that is a public water supply?

Dennis – DEQ is telling drillers that anything serving more than one home is public + requires IDEQ approval!

Willie — problem w/ drillers using domestic start cards for public water wells — federal 15 connections 25 people

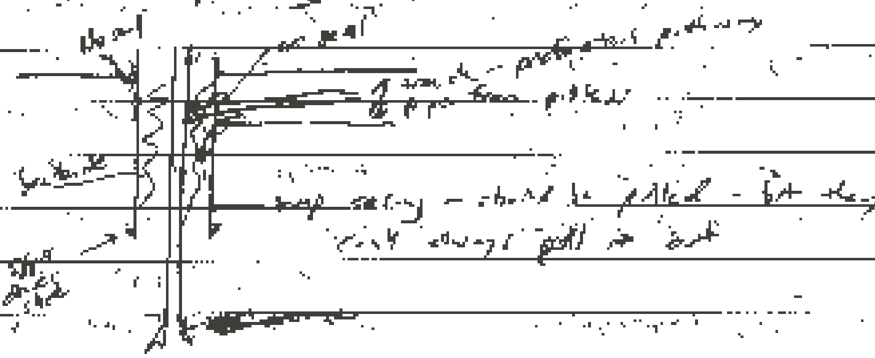
- recommends definition of public water system + public water supply well (≥10 dwellings)
  ↳ (IDAPA code) be put in IDWR rules

Dennis + Willie

- would like to see stronger definition of formation seals vs surface seals

Dennis — [illegible] don't think — [illegible] surface casing + production casing + call it a surface seal

- but put pitless through the surface casing leaving an incomplete seal



Greg — Definition in statute of public water supply flexible

- lets them declare anything a public water supply if there is a public health threat

Inquired how driller is to know what is a public water supply?

Dennis — he is telling drillers that anything serving more than one home is public + requires IDEQ approval

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Dennis – start card always a problem – can start as soon as they send start card in – sometimes sent in Friday 4:30pm

- start cards in new Dakota code – licensing rules

- Abandonment of wells

Dennis – wants change in code so every replacement well would require old well to be filled w/ bentonite + pull pipe – permanently abandon

- If not, leaves source/pathway for pollution

- need to clarify who is responsible for abandoning wells

- PVC casing – currently not allowed

- WY allows it – other states allow it – why not ID

- Dennis doesn't like PVC – loses 1/2 strength in 5 years

- according to pipe manuf, you must have centralizers, hang not stand, factory part (no sawing)

- sand pack sides, everything else supported w/ bentonite or sand (to prevent plastic from flexing due to rock against sides)

- No gluing + screwing – glue + set OK

- problem w/ PVC in wrong formation

- weather ag – 10 state standard

Casing thickness – difficult to enforce – using 1/4 in casing for > 6" casing not appropriate – strengthen rules or clarify? or continuing education

Dennis – Need to incorporate DEQ rules (like 7/8" for public water system)

Jim – How about a section on public wells in rules – yes

(5)

Dennis — Rules should be very specific because drillers interpret rules differently — makes it difficult to enforce

Biggest problems
— seals
— PVC
— placing well too close to septic systems, canals, etc

We recommend a section on well siting. Favorable response

Dennis — problems with siting wells near canals, ponds etc
— Dennis sites well in middle of feeding area

Greg — Use of puddling clay should be disallowed as seal
— Can stop it for public water supply during design but only for domestic wells

I asked about well locations — need for correct locations on well logs
— Dennis — 40% wells are mislocated
— Everyone agreed requiring GPS location — lat + long a good idea — low cost

Greg — Ashton study
— Description of subsurface stratigraphy terrible — need better descriptions

Jim — Utah requires drillers to bag samples + keep them

Dennis — Accurate lithology allows better design of later wells to protect groundwater

Low temp geothermal wells:
Dennis — Rules are adequate but drillers don't follow rules

Greg — Primary concern is inadequate sanitary seal — Needs to be deeper + thicker

Dennis — water tight cap required on well when driller leaves the site
Irrigation well — after pump installer comes, configuration changed
— Oil lubricated pumps should not be allowed — mineral oil OK

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Jim – (6)

Should rules have sections on pumps? + pump installation

– make a req. of pump installer not to impact the seal or use of oil, etc.

– problems with lowering tube down, ① cutting casing off at ground level, ② cutting into seal when installing pitless

Dennis – should require pump test after development to get real info on yield

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482 Constitution
Idaho Falls, ID 83402

For the last several months I have been working on an EPA grant to help rural communities with ground water related problems. During the course of this work I learned that many of the engineering firms working for these communities do not realize the range of well construction and completion options available to them, much less the strengths and weaknesses of these options. In these instances improperly constructed wells may not only cost the city money, but also may potentially damage the aquifer. I think the well construction standard should outline the well construction options and point out that drillers and well designers will be held accountable if a well proves to be poorly constructed.

Improperly sealed wells allow direct communication between aquifers and/or surface contaminants and aquifer. I think a standard specifying a minimum of 18 ft does not adequately protect the resources of the State of Idaho. The well should be sealed from land surface to the depth at which the well is open to the target aquifer. This is the only way I can see to protect the aquifers in our state.

I also have run across wells that pump sand. Excessive sand pumping can cause aquifer material to shift and settle around the well. This can result in a compromise of the well seal as the overlying strata also settle to accommodate settling in the aquifer. If sand pumping continues settling in the overlying strata can compromise confining aquitards allowing communication between aquifers or direct communication with surface water.

I do not think the standards need to be a set of procedures; the driller/well designer should use their judgment regarding which completion method is appropriate. However, the driller/designer should be held responsible for wells that produce untreatable amounts of sand or can be shown to cause aquifer contamination problems as a result of improper design or construction.

University of Idaho

allan Wylie

Rocky Mountain ENVIRONMENTAL

May 9, 2003

Jim Rush
Rocky Mountain Environmental
482 Constitution Way
Idaho Falls 83402

Re: IDWR Idaho well Construction Standards I.D.A.P A. 37 03.09

Dear Jim,

Thank you for this opportunity to provide comments and suggested changes to these rules. My suggestions are as follows:

I would suggest these rules be divided into specific sections, private water supply wells, public water supply wells those regulated by DEQ via their Drinking Water Rules. (DEQ refers to DEQ Drinking Water Rules), irrigation water supply wells, and monitoring wells. Different construction criteria apply to all of the proceeding.

The regulated community needs to understand these are rules and not suggested criteria. If the rule can not be met waiver criteria should be provided so as to establish a basis for allowing the noncompliance

I would suggest if a permit is granted for a specific type of well and the owner later tries to change it to another use that it not be allowed as the well was originally constructed to a minimum standard. For example a well is permitted for irrigation and after it has been constructed and used the owner may want to change its use to say public water supply. This proposed use change should be denied by the rules, as it was not constructed to meet public water supply standards. Over the years I have observed individuals applying for a private water supply well permit and having the well drilled and developed they decide to change it's us and request it to be approved for a public water supply well. Once again this should be denied via the rules because the DEQ did not approve its location, review engineering plans and specifications as per their rules.

IDWR may want to consider starting a private domestic water supply program for construction and minimum public health criteria. This would compliment their existing ground water monitoring program and help validate health advisories they issue when ground water violations are found.

The existing rules specify minimum well casing thickness of 0.250 inches regardless of the well size. For the construction of larger wells the IDWR rules should defer to DEQ rules for minimum well casing thickness.

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All well construction materials, grouts, seals, chemicals and drilling fluids should meet ANSI/NSF standards 60 and 61

The minimum surface well seal depth needs to be revised to reflect the minimum well seal depth as found in the DEQ rules for Drinking Water Seals should be pressure grouted. I know some drillers have problems with this concept however the technology is available to prevent gout from entering cracks. Years ago the Department of health now DEQ required all public water supply wells constructed in fractured basalt to be over drilled filled with a cement slurry and let sit for 72 hours or more and then redrilled at a 2 or 4 inch decrease in well diameter. This process was costly but allowed for the well to be sealed.

Upon issuance of a permit to drill a public well supply and prior to drilling of the well the DEQ must approve the well lot and the engineering plans and specifications.

Source water assessments are and have been developed by DEQ and they should be used in the siting of all private and public water supply wells. Permits for public and private wells permits should not be issued if the ground water quality is not safe for consumption without additional treatment and this information should be provided to any lending institution and the potential buyers.

All well drilling equipment prior to starting a new well or entering an existing well must be disinfected with a 100 PPM chlorine solution. This is needed to prevent contaminating wells with bacteria (iron bacteria) that may reside on the drilling equipment.

IDWR needs to have full time inspectors to inspect well construction and to witness the installation of well seals and seals used to prevent cross contamination of aquifers.

Jim I have listed several items for your consideration and would like to offer my assistance to you or the Department of Water Resources either in the negotiated rules making or any advisory group that may need my assistance. I have recently retired and would be glad to contribute my time and experience if given sufficient lead-time. I am sure I will think of additional suggestions after mailing this letter and will add them to a new list.

Sincerely,

Dick

Richard G. Rogers, P.E.
1066 Saratoga Dr.
Boise, Idaho 83706
208-338-9614

Rocky Mountain ENVIRONMENTAL

May 6, 2003

Idaho Department of Water Resources
C/o: Rocky Mountain Environmental
482 Constitution Way
Idaho Falls, Idaho 83402

Thank you for the opportunity to submit recommendations for revising Idaho's Well Construction Standards. I have a couple of broad suggestions, including changes to consideration of environmental monitoring wells, and also the role of professional geologists and engineers to the well drilling process.

Monitoring Well Considerations: DWR should consider separate regulations for completion of environmental monitoring wells and/or geotechnical borings completed as piezometers. Some general points to consider include the following:

1. A separate price structure should be implemented for monitoring wells and piezometers. In some cases, a site may contain dozens of monitoring wells. Although the blanket permit is helpful, it seems that shallow PVC monitoring wells installed for a few years at a site should be considered differently than a "permanent" domestic water well. It is acknowledged that there are DWR costs for processing well permits. However, in the case of sites with many monitoring wells, perhaps a site monetary limit could be employed.
2. For additional aquifer protection, DWR should consider dropping the 18-foot requirement before monitoring well permits are required. As a result of this limitation, there are probably thousands of wells under 18 feet deep that penetrate shallow water bearing zones across the state. Many of these wells are located at contaminated sites, and these wells are potential conduits to aquifers. It seems more protective of groundwater for these shallow wells to be known and tracked. Because shallow wells do not require permits, they have more potential to be orphaned or left without abandonment.
3. Most monitoring wells are drilled under the direction of a Professional Geologist or other environmental professional. At present, the driller is responsible for proper installation of the wells, even though they are taking direction from the P.G. Other states have a separate well driller's license provided to P.G.s or P.E.'s who direct these projects. A test is required, which assures DWR that the professionals know the drilling rules and regulations. At present, a P.G. has to sign and stamp the well completion schematic so the driller can obtain well permits. These dual responsibilities could be eliminated through a separate monitoring well drilling program that recognizes the professionals that are supervising the jobs.

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4. Along the lines of certifying P.G.s/P.E.s to drill monitoring wells, it seems equally protective of Idaho's groundwater if P.G.s and P.E.s were allowed to sign well abandonment forms. If P.G.s have to sign the well completion schematics, they should be equally able to assure that proper well abandonment procedures are taken in closing shallow PVC monitoring wells. They have the training and experience necessary to know appropriate well abandonment methods.

In summary, DWR may wish to consider a separate set of regulations that deal with monitoring wells and piezometers. Drinking water wells and monitoring wells have completely different uses, life spans, and often have differing drilling and completion methods. Well drillers supervise installation of drinking water wells. Professional geologists and engineers supervise installation of monitoring wells and piezometers. The details mentioned in this letter are just a start to the issues that could be addressed in a monitoring well drilling program. There are other nearby states, such as Nevada and Oregon, that have monitoring well drilling programs. Those programs would probably be good models if DWR decided to initiate separate monitoring well programs.

Thanks for the opportunity to present these comments.

Sincerely,

original email signed by

Paul T. Spillers, P.G.
Maxim Technologies

Summary Notes on Potential IDWR Rulemaking—Well Construction Standards
Meeting at DEQ State Office on May 1, 2003

Attending:
Jim Rush, Rocky Mountain Environmental Associates, Inc.
Monty Marchus, Charles Ariss, DEQ Boise Regional Office
Troy Thrall, DEQ Technical Services
Tom John, Dave Hovland, DEQ Drinking Water Program
David Risley, DEQ Source Water Assessment/Protection Program

DEQ has a two part interest in the IDWR rules governing well construction standards:

A. Drinking Water Program—concerned with wells that will serve public water supplies and also with the siting and construction of domestic or irrigation wells near or in the zone of influence of public sources.

B. Ground Water Protection—DEQ has a legislative mandate to develop the State's Ground Water Protection Plan and to promulgate a ground water quality rule. Both of these tasks have been accomplished, and the agency has an ongoing interest in all practices that might impact ground water in Idaho.

1. Well seals—the annular seal should be of sufficient depth and thickness (Drinking Water rules specify a minimum of 58 feet and 2" respectively) to protect against surface contamination and prevent the mixing of waters from water bearing formations of differing quality. The IDWR regulations should be results oriented. Language should be in the active voice and should clearly delineate responsibilities. Many aspects of well permitting and subsequent construction have been handled through administrative procedures that leave room for misunderstanding and abuse. The IDWR rules need to state "affirmative duties" of key parties, such as well drillers, property owners, regulatory agencies, and so on. The idea of separating the well sealing requirements into "surface seal" and "formation seal" components, as is done in several surrounding states, seems to have the potential to clarify this critical component of well construction. The surface seal is to prevent downward percolation of water that may carry pathogens, chemicals, and other contaminants. The formation seal is to prevent the intermixing of waters of varying quality from different aquifers. In practice, the annular seal will often be continuous and both functions will be served.

2. IDWR needs to take a more active role in defining the requirements for well construction on a site-specific basis, taking into account the presence of nitrate contamination, arsenic occurrence, and other hydrogeologic peculiarities that increasingly make a "one size fits all" approach

inadequate. The well drilling community should not be called upon to make these decisions—the technical resources of IDWR and other affected agencies (DEQ) should be employed to provide drillers with the information needed to ensure protection of the ground water resource and, by extension, protection of those who use the completed well.

3. If IDWR is going to continue to use the "start card" system of well permitting, the rules should clearly specify the circumstances when this procedure is appropriate and should impose penalties for abuses. The start card should probably be enlarged to include key questions about the purpose of the well so that it is clear that the driller and the property owner have exchanged vital information that will determine the siting issues and type of well construction that is appropriate.

4. IDWR should consider the idea of placing in regulation a requirement that all wells (both domestic and public water supply) be sited by a regulatory agency (District Health Departments/DEQ as appropriate) prior to initiation of drilling.

5. Several anecdotes about problems that have arisen over well construction were related. Jim Rush was given contact information and will follow-up to develop case histories in support of greater regulatory oversight. DEQ personnel from the Boise Regional Office are available to provide further information. A list of attendees with e-mail and telephone data was given to Jim Rush.

6. Abandoned wells are a problem (growing?) all over the state. No inclusive locational database is available. IDWR rules should specify that permits for "replacement" wells will not be issued unless accompanied by proof that the existing well will be properly abandoned. IDWR and DEQ should pool resources to locate abandoned wells in GIS coverage and develop strategies for closing these potential sources of contamination.

7. IDWR rules should provide specificity in regard to separation distances between wells and potential contamination sources (in addition to setbacks from sewer systems). Location of irrigation wells and any other wells that may be subject to less stringent construction standards must be tightly controlled to prevent adverse influences on wells that supply drinking water—either public or private. This can be couched in terms of "resource protection" instead of "consumer protection," although it was the view of the group attending this meeting that there is little distinction between these two concepts.

8. If possible and practical, the rules may need to deal with the issue of disclosures about ground water quality and well construction in real estate transactions.

9. Certain types of well drilling techniques are less suited to modern construction standards than are others. This puts the regulatory agency in the perilous position of threatening the livelihood of persons who own outdated or inadequate equipment. The group felt that this problem could be avoided by making the rules specific as to results as opposed to method—in other words, the rules do not need to prohibit a particular drilling technique if the proper construction standards can be achieved. If the standards cannot be achieved using a given method, this problem may take care of itself without putting the agency in the predicament caused by prohibiting a given method.

10. Approximately 2080 Idaho public water systems, 96% of them use groundwater. Because some of the larger systems use a mix of ground and surface water, the percentage of the population served by ground water is about 90%. In the interest of forwarding these notes in a timely manner, a database query was not conducted to provide concise figures. Detailed demographic information can be provided at a later date if IDWR proceeds with rulemaking.

11. Those attending this meeting wish to encourage IDWR to proceed with a formal negotiated rulemaking as a means of ensuring the participation of a wide community of stakeholders. The state's ground water resource, while generous, is nevertheless finite and subject to exploding demands and a variety of pollution threats. Numerous groups have an interest in the future protection of this resource and should have a place at the table when the IDWR well construction standards are revised and updated. DEQ would like to be involved in rule negotiations and to receive updates on this process. E-mail is quite acceptable. Until DEQ's Administrator of Water Programs decides otherwise, Tom John may be used as a point of contact (373-0191, tjohn@deq.state.id.us).

This is email received from Bob Elliott Jasper Mt. Drilling:

Jim,
Input on items 1-3 was primarily mine and I feel that the issues are not clearly stated in the summary.

Items 1 & 2 were really one thought ie. that, since the trend has been for IDWR manpower to decrease and rules to increase, rules fostering an alliance between drillers and the IDWR in which the few "bad apples" are weeded out and most drillers are trusted to make decisions "in the field" which "protect the resource" may prove much more productive than producing still more rules which continue to cultivate the current "them vs us" approach and tempts some to often ignore construction standards.

Item 3:
a) For more than a decade the IDWR has made distinctions between "resource protection wells" and "water wells" when licensing drillers and yet makes few distinctions in construction standards to allow for the differences in why, how, when and where monitor wells are placed and who makes those choices or retains responsibility for the wells (many for which require waivers which leave drillers alone with unrealistic long-term responsibilities). Monitor wells are most often short-term, frequently placed in areas which are already know to be contaminated and 25-35% are shallower than 18ft and yet intended to monitor some portion of the 18 ft. surface seal zone.

b) Since Idaho defines a "well" as being 18 feet or greater in depth, a significant number of monitor wells go both undocumented and unregulated. They have no logs or as-builts filed with the IDWR and are not subject to IDWR construction standards.

c) Construction standards for "Resource Protection" or Monitoring wells should reflect their distinct nature and purpose. Monitor wells are usually built to the specifications of environmental consultants who are often attempting to monitor pertro- base contaminates floating on a fluctuating SWL (Static Water Level). Most of this contamination is relitively shallow, often from leaking UST's (underground storage tanks) the bottoms of which is often 12-15 feet below the surface. Sometimes this might result in 17 ft deep monitor well with as much as 15ft of screen, making it necessary to have only a 2-3 ft bentonite seal.
Since such a monitor well less than 18 feet is not legally a "well" in Idaho it is neither regulated or documented but is none-the-less tracking contaminates which puts the resource at risk and may be required by the DEQ.

d) Land owners AND consultants must share responsibility with drillers for construction, maintenance and abandonment or Resource Protection Wells!
Unlike most water wells, drillers often have little say in how, when or where monitor wells are constructed. These things are usually determined by consultants and on-site conditions. And yet currently the bulk of the liability in Idaho is borne by the driller alone. For example, if a well is greater then 18 ft in depth (and therefore legally an Idaho well) but needs screen to say the 10ft level, the IDWR currently requires a waiver which pretty much makes any subsequent groundwater contamination which is determined to result from a less than standard surface seal the liability of the driller alone. But a 17ft well in the same spot with screen to within a few feet of the surface and almost no seal is evidently a liability to no one since it by definition is not really a legal well. The motivation here is wrong! There is no assurance that the same driller will even be called upon to abandon the well when it has served it purpose. Drillers should remain responsible for the proper construction of wells within the constraints placed by consultants and onsite conditions. Consultants (who must now submit proposed well designs to the IDWR) should be responsible for the design and placement of wells. Once wells are constructed, there is no assurance that either the driller or consultant will remain involved with the monitor wells on a given site and the liability for maintenance and subsequent abandonment should fall to the landowner.

e) Often the locations and depths of monitor wells must be determined or adjusted "in the field" and "on the fly" and not at a desk! Yet, unlike Washington State, currently IDWR expects to be notified of the design, depth and location in advance and expects us to seek approval for changes. Often IDWR people can't be contacted from the field in a timely fashion, either due do the remoteness of the site or because no one is in the IDWR office!

f) Idaho should consider a "blanket" waiver of surface seal rules and rules concerning the maximum % of well depth which may be screened and instead concentrate on making both drillers and consultants responsible for constructing any well which allows contamination to breach confining layers.

g) Paperwork overload and compiled well data:
Paperworkload both onsite and in the office is getting un-necessarily burdensome to the point of keeping us from more important matters such careful well construction.

One solution is to discard old multi-part generic well forms in favor of a form specific to monitor wells which includes important info which is currently omitted such as the name of the consulting company and their onsite representative. All start card, logs, etc. should be able to be submitted in electronic form saving time and money on both ends since the driller would need not transfer data from their computer system to a paper form only to have the IDWR transfer it back again to enter in their database. An on-screen review by IDWR for accuracy

and omissions would be all that was necessary prior to database entry.

Resource Protection Well data compiled by the IDWR should be easy to access and separate from water well data! Currently data is incomplete and hard to access. Important info is lacking such as consulting firms and wether wells are part of an active DEQ concern or not.

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